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ELECTRIC VEHICLES

May 1 to December 31, 1913

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Volume III CHICAGO, MAY, 1913 Number 5

The Electric Vehicle Association of America

What It Is, Its Plans, and What It Has Accomplished

BY S. F. McINTYRE

NOT only in the motor truck field, but in all American industries probably, the Electric Vehicle Association of America is unique. Nowhere is competition more spirited than in the automobile industry and its various allied lines of business. Yet in this association 380 manufacturers of electric vehicles, storage batteries, accessories and so forth, and a goodly proportion of central stations where electric current is made, are co-operating with enthusiasm to the end of extending the use of battery-propelled motor cars.

Like many other movements that have played a conspicuous part in the development of the uses of electricity, in the cities in particular, the Electric Vehicle Association was the conception of a central station man—Arthur Williams of the New York Edison Company. Three years ago this month the association was formed at a meeting Mr. Williams had called in his office. It then had 29 members and its activity, like its membership, was almost wholly confined to New York City. In these two years it has multiplied itself eleven times in size, and extended its direct influence all over the United States. The headquarters are still in New York, but there is a large New England branch with headquarters in Boston; a similarly important branch in Chicago; and third and fourth branches, one in Philadelphia, and one on the Pacific Coast.

Arthur Williams, President.

In 1885 Arthur Williams joined the Edison Electric Illuminating Company, forerunner of the New York Edison Company. This was his first position. He was born in Norfolk, Va., in 1868, while his father, a Methodist minister, was tempararily engaged at that point. He was educated in private and public schools af Hartford, Conn., and New York. He is now general inspectar of the New York Edison Company, president of the Electrical Shaw Company, president of the Electric Vehicle Association of America, president of the American Museum of Safety, past president of the National Electric Light Association and chairman of its public policy committee. Through his American Museum af Safety connection he received the order of Isabella Catholica of Spain, and Officer de L' Instruction Publique, France. He is a member of the Illuminating Engineering Society, American Institute of Electrical Engineers, president of the Association of Edison Illuminating Companies, past president of the New York Electrical Society, president of the New York Electric Vehicle Association, and officer or member of many other societies and clubs.

The territory in which the electric cars can operate has been enormously enlarged by increase of charging facilities. This kind of mutual benefit well illustrates the function of the association and the success with which it is performed.

The other important work which faced the association in its beginning was to correct some common misapprehensions about electric vehicles which had delayed their wider adoption as compared with gasoline cars. Unfortunately, the misapprehensions were quite natural, and had given rise to deep-seated distrust of the practicability of the electric, in the minds of business men. They are to be blamed on the salesmen of the first crude electric cars, who, in their anxiety for commission and salary increases, tried to create a volume of business by making the most extravagant promises.

The manufacturers of both electric trucks and pleasure cars never intended them for any but city service. For this they are, in the improved form of the present, unequalled for safety, convenience and economy; they are not yet equipped for long distance work, and cannot be until some radical improvement of the storage battery makes them so. The old time salesmen of electrics, however, in his eagerness to go the gas car one better, ignored the manufacturers' policy, told the prospective purchaser that he could get all kinds of things it was impossible to put into an electric out of it, and sowed seeds of disappointment, distrust and disfavor.

The winning back of public confidences, especially when it was originally based on an undeveloped machine—as the electric was then—which at best needed some time and faith for making good; the winning back of confidence in these circumstances is about as hard a proposition as an organization of business men ever had to face.

The character of the Electric Vehicle Association and the genuine spirit of progressiveness in which it was started are told best by the results it has achieved in increasing the number of electrics in use. Such rapid headway did it make that last year the number of electrics in New York City alone, in daily service, jumped 45 per cent; while the increase of electrics in Boston, Chicago, Philadelphia and other large commercial centers was nearly, if not quite, as surprising. To get the full force of this statement it should be remembered that these same years in which the association has been working cover the period of the most rapid development of gasoline cars as business utilities.

In the early days of the association critics were very ready to suggest all manner of "concealed interests." Chiefly they questioned the connection of electric light stations with the organization, or the disinterestedness of their connection. Yet nothing that the association has done has been so important in broadening the field of electric vehicles as securing the co-operation of the central stations. There was not enough in it for them to make it worth while to have adequate facilities for charging or changing storage batteries such as are used in automobiles. On the other hand the use of electric motor cars was restricted because of the infrequency of charging stations.

Largely through the good offices of the association these two interests have been balanced so that now the charging business is at least a self-supporting feature of the central stations.

The association's latest achievement and the work it has laid out for the immediate future appeal to motor truck men as well as to motor truck users, as of very practical value. It is the standardization of certain parts of all electrics so as to simplify the power problem. In order that the same charging equipment can be used for all makes of cars the charging plug must be uniform in all cars. The association undertook a campaign to secure this uniformity and has just succeeded in bringing its efforts to a satisfactory conclusion.

Now the association has under way studies on which may be based recommendations for the standardization of other common details of design and construction. It also has taken up the problem of economy of operation and maintenance—such as matters of power economy, tire economy and the like. The results of these investigations will be the common property of all members.

Realizing that the best method of correcting misapprehension and putting the electric into just the place it is intended to occupy is by the use of frank, unbiased advertising—"copy" which is effective to the highest degree yet is so general that it gives no particular build of electric car any advantage over any other make—the association has carried through a national publicity campaign. At the same time some of the member companies have supplemented the national advertising by doing local advertising along the same lines. A fund of $50,000 or more has been set aside already for use during the coming months, in which the advertising campaign is to be pushed harder than ever, and similar appropriations are planned for succeeding years.

In order that the problems it takes up may have most expert consideration, the association has organized itself into a group of committees which divide its field for concentrated effort. There is a committee on standardization, for example, one on insurance, one on contests, another on transportation, a fifth on rates and charging stations, a sixth on operating records, a seventh on legislation and an eighth on garaging.

The present officers of the Electric Vehicle Association of America are: Arthur Williams, president; Frank W. Smith, vice-president; Harvey Robinson, secretary, and Day Baker, treasurer. The directors are W. P. Kennedy, W. G. Bee, James T. Hutchings, Hayden Eames, Charles Blizard, W. H. Blood, Jr., Louis A. Ferguson, W. W. Freeman, F. M. Tait, E. S. Mansfield, G. H. Kelly and P. D. Wagoner.

During the next three years the association will superintend the expenditure of an appropriation of $30,000, at the rate of $10,000 per year, by the New York Edison Company. The money is to be used for the purpose of establishing an electric garage in New York. This is only one evidence of the constantly broadening scope of the association.

Simple Device Illustrates Ohio Car

A very simple plan was employed by the Ohio Electric Car Company in showing visitors at the Boston show the operation of the Ohio system of control. A stripped chassis, handsomely finished in orange and white enamel, was equipped with controller, steering lever, battery and series of lights.

The system of control used in the Ohio electric is known as the "magnetic" type, as distinguished from the "drum" type employed in many cars. The controller is mounted on an arm attached to the steering lever. It consists of a small gutta percha disc, capping a nickel cup. Turning the disc operates a series of plungers inside the cup, which govern secondary electric currents. They in turn actuate a series of magnets that bring about contacts in the primary circuit.

The lights on the front platform turn on and off when the several speeds are brought into play. Reverse speed and magnetic brake are indicated by colored lights.

Tetrazzini Buys Baker Car

Madame Louise Tetrazzini, the world's premier soprano, purchased a Baker electric brougham, and had it sent to her home in Switzerland at Lake Lugano. Two nights' warbling by this famous songstress more than paid for the car, as her first deposit was a check for $2,000 from the Chicago Opera Company for fulfilling her engagement of the previous evening.

It only required a little coaching before Tetrazzini was operating the electric with all the skill of an experienced chauffeur. Throughout the week she quite gave up everything, so great was her delight in her new plaything.

"I have quite forgotten singing and the opera," she exclaimed one afternoon to the salesman by her side. "See, it glides so smoothly, silently—it is like floating in the air. Ma foi! will not my neighbors at Lake Lugano think it is beautiful and envy me?"

Co-Operation in Electric Vehicle Progress

Address at the Annual Meeting of the Chicago Section E. V. A. of A.

BY ARTHUR WILLIAMS

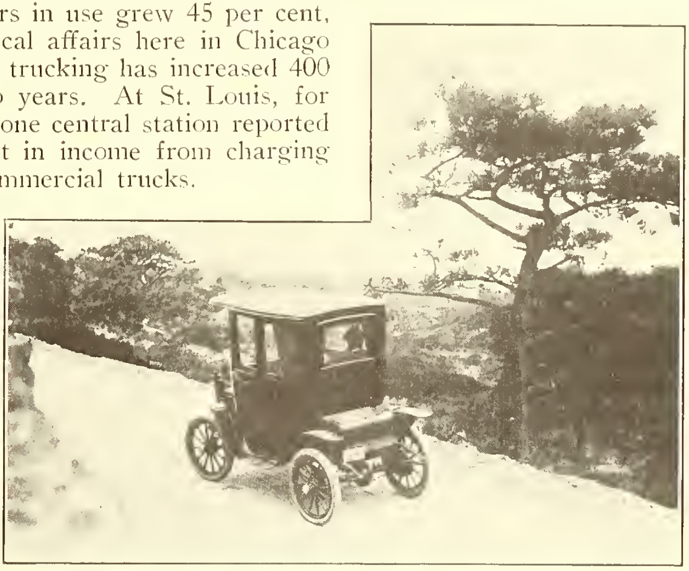
SINCE the organization of the Electric Vehicle Association of Ameri in September, 1910, the electric vehicle industry has leaped forward with remarkable rapidity. Today there are 30,000 such cars in use in this country, about one-third of them having been manufactured and sold during 1912. Already authorities are predicting a production of 15,000 for 1913.

The Old and the New—An Accidental Snap-Shot of a 1913 Baker Brougham and a 1902 Baker Stanhope, to Say Nothing of the Horse.

As members of the Electric Vehicle Association of America, we feel that we are justified in attributing a large share of this prosperity to our organization's efforts. It was this association which banded together the three different yet related interests of electric car makers, central stations and battery manufacturers. Until that time, designers of current-fed automobiles had found cost of production high, owing to comparatively small sales; batteries had, consequently, only a small market, while central station managers, seeing but little demand for current for charging, set the price for such supply at figures which discouraged use of electric motor cars. Co-operation, then, is the force which has been bringing the electric motor car into its own, and the plan for this co-operation originated with the Electric Vehicle Association of America. The success of its scheme, begun only two years and a half ago, shows clearly the advantages of sinking small differences and bending joint energies toward large results. The use of the word "success" does not mean, however, that we consider our association's mission accomplished, or that we have yet come near to doing all we hope.

Everywhere electric vehicles are rapidly gaining popularity. In New York, between July 1, 1911, and July 1, 1912, the number of such cars in use grew 45 per cent, while an authority on electrical affairs here in Chicago estimates that this method of trucking has increased 400 per cent during the last two years. At St. Louis, for the first six months of 1912, one central station reported a gain of almost 37 per cent in income from charging electric pleasure cars and commercial trucks.

The Public Service Corporation of New Jersey has kept a most interesting and careful record concerning the adoption of current driven vehicles in its territory during the past two years. At the beginning of 1911, this corporation established an automobile bureau and began to advocate the electric vehicle. It investigated into the number of these cars within its district, finidng that, outside a few trucks operated by manufacturing plants and business houses, there were few, other than those in the possession of the Edison Storage Battery Company. Only about 80 pleasure cars were discovered, many of these being old models, seldom used. The total number of electrics in the territory was about 139, the average price of current for charging them being a little more than four cents per kilowatt hour.



Baker Special Extension Coupe, Los Angeles-San Diego Hill Climbing.

Since the Public Service Corporation entered upon its campaign of pushing electric vehicles, the total number of them in its neighborhood has risen from 139 to 440, and the average cost of current has dropped from slightly more than four cents per kilowatt hour to an average of a trifle over three and a half cents.

The foregoing instances, illustrating conditions in various parts of the country, serve to show that very generally the electric power wagon has made tremendous strides during the last two years. Today there are about 20,000 electric passenger cars in the United States, with some 10,000 serving commercial purposes. Oddly enough, perhaps 80 per cent of all electric trucks and delivery wagons are used east of the Alleghenies, while by far the heaviest demand for pleasure vehicles comes from the Middle West. This, of course, speaks well for passenger cars, since it shows that, unlike the prophet in the old proverb, they are honored in their home territory, being most popular where they are manufactured.

The rapid advance of electric vehicles into public favor may be traced to several causes, among them improvement in the cars themselves and decrease in cost of current. But these conditions alone would have been ineffectual without the Association, which has been able to convert efforts of individual members into a forceful and compact forward movement.

Methods used to accomplish this may be summed up as: investigation through committees; exchange of ideas by means of papers and discussions at meetings, and publicity, this last term including both direct and indirect advertising.

Publicity work is aimed directly at the general public. When our organization was formed, people in general did not know enough about the advantages of electric vehicles. They were skeptical; they had heard that battery-driven cars and trucks were impractical. It was to combat this widespread ignorance that a co-operative educational and advertising campaign was planned in the fall of 1910. Its scope was to be the advertising of electric vehicles in general, without regard to special qualifications of various makes. The work thus started has been so emphatic a success that a sum of $50,000 was subscribed last year for use of the publicity committee, and we are now planning to raise $75,000 for our coming advertising campaign. In this way we shall be able to follow up the splendid results already obtained.

A new departure by which the popularity of electric vehicles ought still further to be enhanced is the formation of a garage committee, under chairmanship of Mr. F. F. Phillips of the United States Tire Company. This commitee, with subdivisions in several cities, will work to increase the number of charging stations in urban and suburban districts and better existing service.

Given the electric vehicle in its present carefully developed form, why does our Association believe in it and recommend it as *the* car for city and suburban use? Briefly, because of its economy of maintenance, safety and reliability.

In the matter of economy, several facts must be taken into account. In the first place, one electric truck or delivery wagon—owing to its greater rapidity—can do the work of several horse-drawn vehicles. The average life of a horse, pulling heavy loads over city streets is four years, while that of current-fed trucks is twice—sometimes three times—as long. Besides this, the electric truck is proof against the diseases to which horseflesh is heir, and which killed 19,163 animals in New York City between October, 1911, and October, 1912. A novel way of figuring the expense of "man's noblest friend" is suggested by the consideration that it takes five acres of land to grow feed for one horse. If motor cars were generally substituted for beasts of burden, those same five acres could be made to yield food for fifteen human beings, under modern methods of cultivation. A decided economical inducement which the electric motor car possesses over the gasoline is the fact that its simple mechanism enables ordinary teamsters to learn to drive it.

Altogether, it has been estimated that current-driven delivery is from 10 to 25 per cent cheaper than hauling by horse. In our great cities it has been found that foodstuffs which, at freight terminals, are worth $350,000,000, grow to the value of $500,000,000 by the time they reach consumers. This rise is largely due to cost of transportation. In other words, expense of hauling goods adds nearly a third in price to the contents of the market basket. Does this not behoove all of us, as citizens, to look into methods of handling and trucking?

The advantages of reduced fire risk involved in use of electric vehicles must be apparent. Besides protecting the public by eliminating the source of many sudden blazes, absence of inflammable materials in these cars admits them to docks, piers and terminals from which gasoline machines are often excluded. Within the last few months the New England Casualty Company—after careful study of the subject—arranged to grant a large reduction of rates to electric vehicles. This decrease will bring their insurance 20 per cent below prevailing rates for gasoline vehicles.

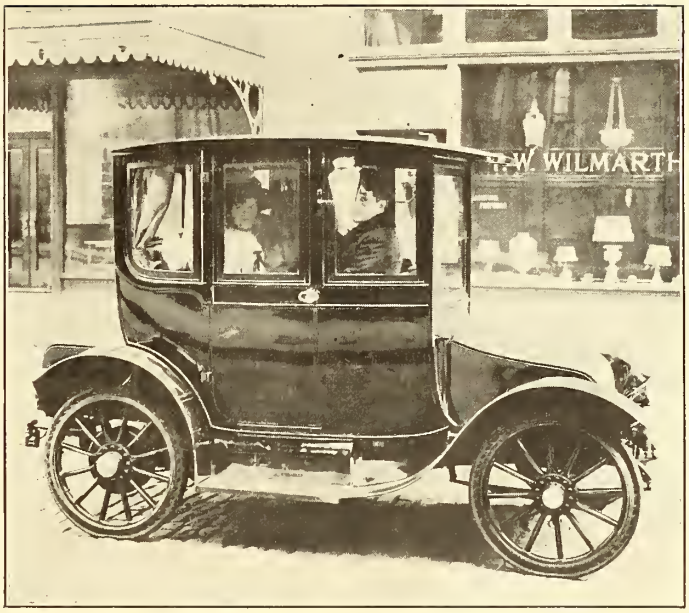
Ease of operation in crowded streets is another important advantage possessed by the electric, to which may be added special suitability for many stops, starts and waits, such as are often necessary in delivery service. The popularity of electrics with department stores, express companies and breweries vouches for their success in distribution service, as does also the fact that they are nearly always owned in fleets. This last condition seems to accord with an old-fashioned advertising slogan, "Once tried, always used," that certainly does not obtain with the gas car.

Speaking of advertising, I cannot resist the temptation to brag a trifle over the fact that last Friday the automobile bureau of the New York Edison Company won a prize. This was the W. O. Poertner cup awarded to Mrs. A. E. Waxham, demonstrator of pleasure cars for the bureau, for her skill in a secret time run conducted by the Motor Dealers' Contest Association of New York.

Madame Tetrazzini and Her New Baker Electric.

I take it for granted that you members of the Chicago Section will care to hear something about the winter's work at the Association headquarters. As my time is somewhat brief, I shall not attempt to go into a long detailed description, but shall call your attention particularly to two papers read at recent metings. Both of them were of unusual interest and remarkable value, not only for material contained, but also for discussion.

At the March meeting Mr. H. F. Thomson presented a monograph prepared by him and Mr. Harold Pender, on comparative advantages of horse and motor trucking. This embodied results of investigation by the electrical engineering department of the Massachusetts Institute of Technology and convinced listeners of the great need for more careful and scientific planning of delivery and trucking service in large cities. Mr. Thom-

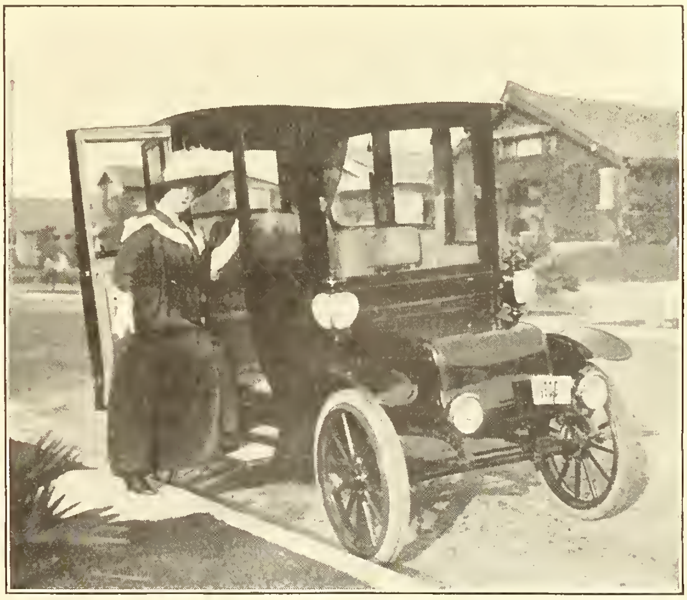


Tetrazzini, Her Husband and the New Baker Brougham.

son deserves the highest credit for his able and lucid assembling of a host of detailed statistics collected by the Massachusetts Institute of Technology. He submitted a chart showing comparative cost of horse, gasoline and motor trucking for various classes of business, such as 1,000-pound wagons, 2, 3½ and 5-ton trucks. It was noticeable that only in one of these divisions did the cost of horse service fall below that furnished by current or gasoline. This was in suburban parcel delivery; but in city service of the same sort electricity was found to be the cheapest means of propulsion. In furniture delivery employing two-ton trucks, in brewing service requiring 3½-ton vehicles, and in coal-hauling where 5-ton wagons were used, electrics went on record as more economical than either horses or gasoline cars. It was also enlightening to discover that in this chart the expense of gasoline delivery service—including maintenance, garage and overhead charges—was shown to exceed horse transportation in city and suburban parcel handling and furniture delivery.

Mr. Thomson laid special emphasis on the importance of "standing time"—that is, loading, unloading and other waits—in figuring cost of trucking, as well as that of the load-factor, or ratio of loads carried to capacity of vehicles. He was able to prove that an enormous amount of "lost motion" exists through neglect to study the mileage-factor, the load-factor and the question of routes.

A unique paper was read before our meeting on April 22 by Mr. William H. Ashton, general organizer of the International Brotherhood of Teamsters and Chauffeurs of America.



Lillian Russell Drives a Baker Electric.

The paper which Mr. Ashton presented had been written by Mr. William H. Tobin, who assured our Association that the Teamsters' Union favors replacing horses and wagons by motor vehicles. As the International Brotherhood has 62,000 members, its position in this matter is worthy of attention. Both Mr. Tobin in his statement and Mr. Ashton in his remarks brought out the fact that their union believes in progress and recognizes that the coming of automobiles is a step in its march.

Mr. Tobin pointed out that skillful horse drivers make the most competent chauffeurs, and that the introduction of power-wagons nearly always makes a teamster's work more agreeable. As instances, he mentioned the absence of Sunday stable duties and anxiety for the condition of horses in hot weather.

Mr. Ashton aroused much interest when he told of how local branches of the Brotherhood in New York, Boston and Chicago are giving their memebrs lessons in driving motor trucks. Arrangements were made to have our educational committee help the men conducting these instructional courses. Our Association has always looked to experienced horse-drivers as the best material out of which to train chauffeurs, because their knowledge of streets, localities and traffic regulations is so valuable.

We were much pleased, therefore, to learn that our ideas and those of the Teamsters' Union accorded, and this meeting of capital and labor was one of the most unusual and successful evenings in the history of our organization.

I do not wish to miss this opportunity to speak concerning conditions here in your own city and your own branches of the Electric Vehicle Association. The Chicago Section, formed last May with Mr. George H. Jones as an able chairman, is "live" and growing. In one year your ranks have increased from 18 names recorded as charter members to 56, and I understand that during the past week six more applications for enrollment have reached the New York headquarters from your city. You have an excellent field for work here, almost at the center of the automobile manufacturing region, and I know that you are not failing in efforts to advance the use of electric motor cars in this territory.

Chicago is, I believe, this country's greatest patron of current-fed pleasure vehicles, having about 2,200 to its credit. You will, I know, like true Chicagoans, be delighted to learn that New York can boast only 400. But lest you should exult unduly, I must hasten to remind you of New York's 1,700 commercial electrics, against which your city can show a record of only about 630. Why should Chicago not outstrip Manhattan in this direction as well as the other?

Much could be done to facilitate transportation of wares in Chicago and other great cities through some arrangement for the conduct of heavy trucking at night rather than in the day time. In this way much delay in traffic during daylight hours could be avoided, congestion could be prevented and freight hauling would be made more expeditious. At present our cities lay out millions of dollars in paving which is then subjected to the heaviest kind of wear and tear by overcrowded rush of day-time traffic, while, on the other hand, it stands idle at night. If bulky goods, requiring to be hauled by large vehicles, could be excluded to a large extent from the streets during their most crowded hours, these commodities might then be easily transported to and from terminals by means of motor trucks at night.

This plan would not necessarily disturb the sleep of a city's inhabitants because such trucking would largely be carried on through business rather than residential districts. Nor would it impose too great a hardship upon motor drivers, since during hot months of the year night work out of doors would be preferable, and at other times the delays and congestion avoided would make the task of driving less arduous. Why could not such a scheme be tried here in Chicago, where, owing to the tremendous volume of traffic, any method for its expedition would be of benefit to the city and to business interests?

A fresh field has recently been opened for the energies of our Association by the organization of a Garage Committee under national chairmanship of Mr. F. F. Phillips of the United States Tire Company. This committee, with its subdivision in several cities, will strive to increase the number of charging stations in urban and suburban districts. Its Chicago branch, headed by Mr. Ernest Lunn, is, I know, already planning an active campaign which ought to result in better facilities for replenishing batteries and, consequently, in increased use of electrics.

When the National Electric Light Association Convention opens here in June, our Association will have a booth which, it is hoped, will still further stimulate interest of central station authorities in our organization. It ought, besides, to forward the growth of the Chicago Section.

The next annual convention of the Electric Vehicle Association of America will be held here in Chicago and its conduct will be in your hands. The time selected is, I believe, early in November, and I sincerely hope this will be the biggest, the most interesting and the most successful convention we have ever held. It ought, indeed, to be, with the prosperity of our National Association and the thriving condition of the Chicago Section to give it zest.

British America Coast Big Electric Car Field

So many electric cars have been introduced into the coast cities of British Columbia, that they have become active competitors to the gasoline car for first place in the public's favor.

Previous to this spring, the electric car was merely represented in the automobile showing in British Columbia; gas cars prevailed entirely. But owing to a campaign recently launched in the interest of the electric car, it has sprung into demand and liking, the campaign being not only for the pleasure vehicle or for the commercial car, but for both. Now, nearly all types of the electric car are represented by agencies which have done a successful business this year, in contrast to the small number of cars sold other years. Accurate statistics as to the number of electric pleasure cars in service in Vancouver and Victoria are not available but reports from the agencies indicate that the total is now worthy of note and that it will probably be doubled before next season. One firm in Vancouver which operates a garage has made an attractive offer in connection with the sale of electrics. This concern provides for the garaging of the electric, charging of battery, delivering and collecting vehicle daily for $30 per month, thus placing at a cost of $1 per day an electric pleasure vehicle at the service of the owner.

The British Columbia Electric Railway Company is encouraging the demand for electrical trucks and has taken out an agency for the General Vehicle Company in Vancouver. Five electric trucks are being operated by this concern in connection with the Vancouver light and power service and an increase in this number is being contemplated. One of the trucks, a three-ton which has been in service constantly for the last seven years, is still giving perfect satisfaction. In Victoria, a number of firms have adopted the use of the electric truck and a number of other firms have decided to swing into the electric truck brigade and have placed orders for the desired cars.

Public charging stations are maintained by the B. C. Electric Company to satisfy the demand for current for electric trucks. Other firms operating electric trucks stations in addition to those maintained by the B. C. also own charging stations. Vancouver has nine public company. On Vancouver Island there are eight public stations and many private ones. Five cents per kw. hour for current is the maximum charge made by the B. C. Electric.

Electric Car Garage for New York

Following an address by W. C. Anderson, president of the American Electric Car Company, to a meeting of the New York Edison Company's managers, a special appropriation of $30,000 was voted for the purpose of establishing an exclusive electric car garage in the city of New York. Mr. Anderson explained to the New York Edison Company how it was actually losing a considerable income which would accrue from the charging of electric cars; that this situation could be reversed in its favor if it as a company would do its part in the establishment of a strictly high class, exclusive electric garage where mechanical and electrical service of the highest character might be secured at reasonable prices. Mr. Anderson also suggested a vigorous educational campaign to acquaint customers with the unusual and desirable capabilities of the electric car for town and suburban use.

The $30,000 appropriation will be expended at the rate of $10,000 per year toward the rental and promotion of an electric garage. So that no partiality might be shown to any particular make of electric car, it was determined that the expenditure of the appropriation should be under the jurisdiction of the New York office of the Electric Vehicle Association of America.

Aside from this special expenditure, the New York Edison Company will advertise through the New York papers and by personally addressed letters the general utility and practicability of the electric automobile of today.

The result of the campaign, it is said, will be felt in New York by every electric car user and manufacturer.

Charging Your Own Car

The Ease and Economy of Operating a Private Electric Garage or Charging Plant

BY JOHN B. RATHBUN

In the preparation of this article no attempt has been made to enter into the technicalities of the charging process. Its purpose is to give the electric car owner a general idea of the appliances used and their practical application to the pleasure vehicle, as well as a few hints on the care of the storage battery. Charging is a very simple operation, especially when compared to the care and maintenance of the gas car, and requires no special mechanical or electrical knowledge.

CONTRARY to the general belief, the mere operation of charging an electric car is as simple a matter as running the car on the road. It requires no special electric or mechanical knowledge, and practically no attention or physical effort. When once installed, the charging apparatus may be operated by any member of the household after a few moments of instruction, one of the many advantages of the electric vehicles over its more complicated rival, the gasoline car. If owners of electrics only realized how independent a home charging outfit made them in their comings and goings, and the saving made in the power bills, it is certain we would see more private garages than exist at the present time.

Aside from the garage charges, and the indifferent care that is often given to a car in a public garage, there is always a considerable loss due to the trip from the garage to the residence of the owner, and then back to the garage. In many cases this loss is more serious than is commonly supposed, as the great majority of car owners live two or three miles from the source of current. This means that from four to six per cent of the charge is expended uselessly; in hilly country this may be even higher. When the charging is done at home, the owner is always sure of his battery condition, and knows exactly what he dares to attempt, at any time of the day. The truth of these statements will be verified by any one who has owned a charging outfit.

Primarily, the charging operation consists of passing a direct electric current through the cells in a direction opposite to that given by the cells in discharging or running the car. By reversing the flow of current through the cells in this manner, the chemical composition of the battery fluid and the plates is brought back to the original state as it existed before they were discharged. When no further change can be accomplished by passing the current through the cells, the battery is said to be fully charged, and it is evident that continuing the current beyond this point is simply a waste of electrical energy. If the current has not been continued long enough to bring all of the material back to its original composition, there will only be a portion of the cell elements that are in a condition to furnish current to the vehicle motors, which reduces the mileage as well as the efficiency in proportion to the inactive part of the battery plates. By means of instruments that are practically automatic in their workings, it is possible to determine the exact condition of the cell without delving into the chemical or electrical mysteries of the batteries, this being reduced to as great simplicity as filling a tank with water.

The apparatus used in charging the batteries is merely a current controlling device that either reduces the pressure of the lighting current to meet the demands of the vehicle, or converts the alternating current of a lighting system into the direct current required by the battery. This naturally divides the apparatus into two classes, the "rheostats" used for reducing the pressure or voltage of the direct current supply, and the "rectifiers" used for converting alternating current into direct current. The first acts by introducing a "resistance," or a device having a low conducting power, into the circuit that throttles down the current. The second stops the waves of the alternating current that act in the opposite direction to the true charging current direction, allowing only those to pass that act in a proper direction, which is opposite to that furnished by the battery to the motor when propelling the vehicle. This action may be likened to a turnstile that allows traffic to pass in only one direction.

As the storage cells only oppose the lighting circuit of 110 volts to the extent of their own voltage (60 to 80 volts), there must remain a voltage of from 30 to 50 volts that tends to force the charging current through the cells. Since the resistance of the batteries is very small, this comparatively great difference in voltage would force a current many times greater than the normal charging rate, a current heavy enough to destroy the cells, unless a resistance were placed in circuit that would cut the flow down to the required figure. The resistance in this case is known as the "rheostat," and may consist either of wire coils of a high resistance composition, or a series of high resistance plates or "grids" that are arranged so that the resistance can be altered by cutting out more or less of the coils or grids.

A controlling lever mounted on the rheostat makes the current adjustment very simple, as moving it increases or reduces the resistance.

This adjustment is necessary for the reason that the voltage of a battery under charge is continually increasing, which, of course, requires a constantly decreasing resistance if the current is to be kept constant. The greater the number of cells or the higher the voltage, the lower the resistance of the rheostat, providing that the voltage of the lighting main remains constant, a condition that is true within very small limits.

When direct current is used for charging, the difference in voltage between the lighting mains and the battery represents a loss of energy as far as the cells are concerned, for it is converted into heat by the rheostat and is radiated to the surrounding air. As an example of the extent of the rheostat loss, we will assume that the battery voltage is 80 and the line voltage 110, giving a difference of 30 volts. With a charging current of 40 amperes, there will be 30 times 40, or 1,200 watts, dissipated per hour (1.2 kilowatt-hours).

While this may sound rather like a technical explanation to the average owner or prospective owner, it is not involved in the actual charging of the car; for the only thing that is left for him to do is to adjust the lever of the rheostat until the needle of the ammeter on the control board or car reads an amount specified by the builder of the car, a process that is as simple as turning on a hydrant. After doing this, he leaves the outfit alone until the car is well on the way to full charge, when he again makes the adjustment. When the charge is completed he opens the line switch and removes the charging plug that connects the car with the lighting circuit. That is all.

DIRECT AND ALTERNATING CURRENT

The charge held by a storage battery depends entirely upon the chemical composition of the active material on the plates. The difference in chemical potential or energy causes the flow of current, and as the cell is discharged the plates gradually reduce to an equivalent composition. To restore the plates to their normal activity, a "charging" current is sent through the cell, which creates a difference in the chemical composition of the plates and again establishes a difference of potential. During this time the electrolyte also undergoes a change, certain portions of the broken-up fluid combining with both the plates.

As the changes taking place in the cell are dependent upon the direction in which the current flows, it is evident that a continuous current must be used, that flows always in one direction. If the direction of flow were frequently reversed during the charging operation, each reversal would result in neutralizing the effects of the previous direction of flow, and as a result the plates would be in the same condition at the end of a given time as they were at the beginning of the charge. A current that fulfills these conditions is known as "direct current." The direction of its flow is indicated by its "polarity," or its behavior in respect to some fixed part of the circuit, such as the battery terminals.

Every piece of electrical apparatus is provided with two terminals for each independent circuit, one terminal being called the "positive" and the other the "negative." In every case, the current is considered to flow from the positive pole to the negative through the circuit connected with them. The current flows from the positive pole of the battery to the motor and returns to the negative. The only possible question that could arise in the application of this simple rule would be in the connection of the charging current to the battery. In this case the positive of the current supply is connected to the positive terminal of the battery.

This apparent contradiction is due to the fact that the battery and charging currents flow in opposite directions, and that the poles of the cells are marked according to the current furnished by the cell and not according to the polarity of the charging current. The positive of the current source or supply should always be connected to the positive of the circuit to which it is connected. Thus, in marking the terminals of a storage cell, it is considered that the battery is a source of current. The positive terminal is marked with a plus sign (+), and the negative with a minus (—) sign.

An alternating current, on the other hand, changes its direction of flow periodically, the voltage and current value changing uniformly with each reversal in direction. Usually the reversals or "alterations" of the alternating current supplied by the lighting companies are made at a very high rate, the most common rates being 50 and 120 changes in direction per second. Instead of stating the reversals in terms of the number of times that the current changes in direction, the electrician rates the current by the number of double reversals ("frequency") or the number of "round trips." Each round trip of the current, back and forth, is known as a cycle, the number of cycles being equal to half the number of alternations.

If an alternating current were connected directly to a storage cell, it would alternately charge and discharge the plates, leaving the battery in the same or a worse condition than it was at the beginning. Battery charging by alternating current is made possible only by the use of a rectifier, which takes the reverse waves and turns them in the required direction.

(*To be continued*)

Portland Has Electric Garage

Twelfth and Alder streets, Portland, Ore., is to supply the home of the Gibson Electric Garage, whose temporary home is situated at 548 Adler street. The new store will be the first outpost of the Alder street auto row.

An exclusive electric garage is a need that has been felt in the city for some time and the new concern, under the management of such well-known men as Foster C. Gibson, A. E. ("Dad") Foss and R. R. Giltner, should certainly fill the bill. Electrics and all that pertain to them will be the business of the new garage, nothing in the line of gas or steam being handled.

It is a great opportunity, as the gas garages do not care to handle the electric. The people who are backing the garage only intend to care for the machines.

Specialists in their line, they should succeed. The ordinary garage men are not capable of handling the electric car and do not like to see them come in their doors. This is for the reason that they have specialized in gas cars and indeed know little about the electric vehicle.

In addition to the ordinary garage work on the electric car the new firm will have a department devoted to storage battery charging as at the present location and will also care for lighting and self-starter apparatus. Day and night service will be arranged.

Cleveland to Uphold Low Rate

Three cents per kilowatt-hour will be the maximum rate established by the municipal light plant in Cleveland, O., during the present year. The minimum rate of one cent will apply only to large consumers, but no distinction will be made between users of light and power.

Annual Meet of Chicago Vehicle Men

Chicago Section of the Electric Vehicle Association of America Convenes

BY PAUL H. WOODRUFF

"STRICTLY informal—come right from the office," was the way the invitation read to the annual meeting of the Chicago section of the Electric Vehicle Association of America. Dinner was to be served at 6:30 in the Hotel Sherman's Louis XVI room; John F. Gilchrist was to act as toastmaster, and there was to be "entertainment that everyone will enjoy." All of which happened as per schedule, on the sixth evening of May.

It may have been nearer 7 than 6:30 when soup was served; which only goes to show the more surprisingly what a great amount of work—and play—the members of the E. V. A. can get away with in a few hours. The first discussion of the evening was the following menu:

MENU.

LITTLE NECK CLAMS
GREEN OLIVES SALTED ALMONDS
POTAGE MONGOL
PHILADELPHIA CAPON, ROTI A LA BROCHE
POTATOES BYRON
FRESH PEAS IN BUTTER
COMBINATION SALAD
ROQUEFORT CHEESE, HONGROISE
TOASTED CRACKERS
COFFEE
BRONX COCKTAIL CORINA CIGARS
PHILIP MORRIS CIGARETTES

Between courses, and, indeed, right in the midst of courses, the diners regaled each other with bursts of song, the words therefor being kindly supplied in a booklet at each plate. The unusual feature of this event lay in the fact that the result was really melodious. To encourage and egg on the amateurs to greater efforts, and incidentally to give them occasional opportunity to grab a spoonful of soup or a bite of chicken, two professionals were present and active; C. B. Roe, of the Oxford Quartette and Miss Renee Dyris. All the songs were of the well-known popular variety except three, and presumably these three have since become popular. They were of a topical nature, with the electric truck as a motif, and were composed by W. J. McDowell, F. M. Nourse and L. E. Wagner in competition for a dinner offered by Vice-Chairman Godfrey Atkin. The lyrics were so good, however, that at last accounts Mr. Atkin seemed to be stuck for three dinners. Here they are—the songs, that is:

SEND A TRUCK.

BY W. J. MCDOWELL.

[Tune, "Send the Light."]

A call comes ringing from the horse owner's desk,
Send a truck! Send a truck!
I have ten horses lame, something ails the rest,
Send a truck! Send a truck!

Send a truck, a swift electric truck,
Let it run from store to store.
Send a truck, a clean, convenient truck,
And I'll soon be buying more.

Soon the salesman called at the horse owner's desk,
Sold a truck! Sold a truck!
Now his horses no longer cause him distress,
He has a truck! He has a truck!

Now the truck, the swift, electric truck,
Makes its run from store to store,
And this truck, this clean, convenient truck,
Made him buy a dozen more.

IN MY GARAGE.

BY F. M. NOURSE.

[Tune, "In My Harem."]

In my garage, my garage, there's G. V. Baker, Walker,
And there never was a minute that gasoline was in it;
A load for breakfast, a load for dinner, a load at any time,
A mile of heavy trucking and it only costs a dime.
In my garage, my garage, there's thin-plate, Edison, Exide,
And the work they do,
Would make you wish that you,
Had talked with the E. V. A.

Homer E. Niesz, Chairman.

Twenty-seven years ago Homer Eldredge Niesz broke into the electrical field by way of an apprenticeship in the Western Electric Company's arc light and testing departments, having just graduated from Mount Union College at Canton, Ohio, where he was born in 1868. From the Western Electric he went with the United States Electric Lighting Company, then with Leonard and Izard, Western agents for the Edison General Electric Company. In 1888 he became assistant superintendent of construction for the Chicago Edison Company. A year later he was made assistant to General Superintendent L. A. Ferguson, which relation continued when Mr. Ferguson became vice-president. In 1909 he became manager of the Cosmopolitan Electric Company of Chicago.

D. C. Arlington, Vice-Chairman.

William J. McDowell, Secretary-Treasurer.

George Harvey Jones, Executive Committee.

SONG OF THE DELIVERY WAGON.

By L. E. Wagner.

[Tune, "Rag Time Soldier Man."]

I've got to go, I've got to go,
Steady job I've got, you see—
I've got to go, I've got to go,
I hear the people calling me,
Oh, my motor, hurry up, hurry up,
Get a move on, hurry up, hurry up,
Can't you see that Mr. Kelly is keeping tab on me?
My battery, my battery,
You better not lay down on me,
If you need a boost, if you need a boost,
Mr. Rudd is near, you see—
So we'll carry the goods through old Chicago,
And when the day is done, to the garage we'll run
Ready for another day.

The official session was opened by Chairman George Harvey Jones. He rapidly sketched the accomplishments of the year, the work done by committees on proper facilities for garaging in all parts of Chicago, changes in city street ordinances affecting traffic conditions, the one-direction routing of heavy traffic in alleys, the parking of vehicles, the second-hand car problem, and the plans for a school to teach electric vehicle handling to young men.

Ballots containing the recommendations of the nominating committee were then distributed to the members. It had been decided that the executive committee should include four members besides the officers, instead of two. It was voted, therefore, so to amend the constitution and by-laws, and the election resulted as follows:

Chairman, Homer E. Niesz; vice-chairman, D. C. Arlington; secretary and treasurer, W. J. McDowell. Executive committee, those officers and W. L. Rudd, George H. Jones, Uri B. Grannis and L. E. Wagner. The latter two are new committeemen.

Uri B. Grannis, Executive Committee.

Mr. Niesz made a brief but hearty speech of acceptance, in which he committed his administration to carry on the work so ably begun by the previous one.

Toastmaster Gilchrist read a telegram from Thos. E. Edison regreting his inability to be present, but promising to join the vehicle men at the national convention. National President Arthur Williams, it was announced, was prevented from coming at the last hour by legislative matters in New York. An able representative of Mr. Williams was present, however, in the person of F. C. Henderschott, who brought the president's felicitations and read his address. This paper was extremely interesting and optimistic, and is printed on another page. His closing announcement, however, may well be repeated here: That the annual convention of the Electric Vehicle Association of America will be held in Chicago early in November, probably about the first of the month.

The next speaker on the program, N. H. Van Sicklen, president of the Automobile Trade Association, was unable to attend, but sent his regrets. The toastmaster read a clipping from a morning paper which recalled Mr. Van Sicklen's participation in the last lap of the Boston to Chicago bicycle road race, held twenty years ago.

The toastmaster then introduced E. E. Witherby, district manager of the General Vehicle Company. Mr. Witherby, said he, was one of the youngest drum majors who ever wielded a baton, and still led the procession. The G. V. representative's talk was on "The Significance of Electric Truck Reorders." It appears under that title on another page, but his point that economic law is back of the electric truck, and bound to win out, is worth repeating again and again.

W. C. Anderson, president of the Anderson Electric Car Company, Detroit, was scheduled to appear right after Mr. Williams' address, but he said he wasn't ready. So he was introduced as the final number on the program, which led to some banter as to his wanting the last word. He got it, anyway, to the extent of twenty-one typewritten pages, and "not a dry word in it." Most of it will be published next month. As will be seen, Mr. Anderson rather took the central stations of the country to task for not co-operating more aggressively with the vehicle manufacturers. It was felt, however, that few of his remarks applied to the situation in Chicago, where co-operation of the kind he described is well developed.

A note of solemnity was injected to the festivities by the announcement made by Mr. Atkin that F. J. Newman, president of the Chicago Motor Car Company, was seriously ill in a Chicago hospital. A resolution of sympathy and desire for his rapid recovery was offered and unanimously adopted.

The meeting adjourned at 10:30.

Glasgow Corporation Tests Edison Battery

If report speaks truly, the Glasgow (Scotland) Corporation will shortly be in a position to report upon the behavoir of an Edison battery as applied to an electrically propelled motor-van. Subject to approval, the electricity committee propose to purchase such a vehicle, which could be used either for rushing the repair gang to the scene of an accident, or to convey stores or appliances from one depot to another.

The Edison battery with which this vehicle is fitted is claimed to be capable of propelling it a distance of forty miles on one charge at a cost of less than one penny per mile. Although these batteries are being extensively used in the United States, they have not hitherto made as much headway in Great Britain, and it is to be hoped that careful records will be kept, and, if possible, subsequently published in British papers, detailing the behavior of this battery under actual service conditions.

How a Woman Sells Electrics

Women are the Buyers of Electric Pleasure Cars, and Many of them Prefer to Deal with a Saleswoman

BY MABEL CONDON

Mrs. C. M. Lampard.

IT was a typical April morning, the kind that deludes you into starting out without an umbrella and then sends you hurrying back two blocks for the despised rain protector. It was a good thing I went back in this case, for, by the time I reached Michigan boulevard and the Detroit Electric Car Company, the shower had become a deluge and my umbrella left a shameless trail from the front door back to Mrs. C. M. Lampard's desk.

Mrs. Lampard? She's Chicago's saleswoman for Detroit Electric cars, and it was to keep my nine o'clock appointment with her that I arrived in haste and the rain, at nine-five.

"My time's all my own this wet morning," Mrs. Lampard announced as she led the way to a big leather divan, where, if you sit back ever so little your feet and the floor part friendship. I tucked my umbrella behind a radiator to drip itself dry and was then ready to hear how one woman has made a really, truly success of selling electric automobiles.

"How in the world did you happen to go into the business of selling cars?" I wanted to know. "Through selling theater program advertisements," she told me, "and in that way met Mr. D. E. Whipple, the Chicago manager of the Detroit Electric Car Company—'Detroit Electric Whipple,' we call him. He told me if I could sell cars in the same convincing way that I sold him theater program advertising, I would unquestionably make a success of it. It being the policy of the house to have one lady sales person, as soon as there was a vacancy on his selling staff, he asked me to take it. It was quite some proposition to undertake, without any knowledge of the subject, but I have always thought in large numbers and the proposition I could comprehend would not seem too large. I've just been here since the first of the year, and in no time was fully equipped with the technical knowledge, and now —why, if I thought the salesmen here knew anything about the car that I didn't know, I wouldn't rest easy a minute."

"What do women most consider when buying a car?" I wanted to know, and Mrs. Lampard's ready answer was, "The appearance.

"Ninety-nine out of one hundred women," she said, "buy a car on appearance in preference to one that may be better in point of construction and safety. So many cars are top-heavy, they are wider than they should be, their weight is not evenly distributed, they may be freakish, even, but if a woman likes its appearance she will buy it. It may be the particular kind of vase that she prefers or the way the top is tufted. Whatever it is, it is sufficient to determine her choice, while a man purchasing a car goes at it from an entirely different angle. He looks to the scientific construction and the logical reasons why the car he is purchasing is the best car for him. He has previously made a mental notation of the features he requires in a car: Safety, comfort, beauty of outline, durability, low maintenance expense, and last, but not least, a knowledge of the organization back of the car.

"Here is something that has greatly impressed me—that driving an electric automobile, while it is a modest, sedate conveyance in appearance, is, nevertheless, a most fascinating game. It's just as exhilarating, just as exciting, just as stimulating as any other sport; in fact, it's an all around tonic, mentally as well as physically. It keeps real warm human blood flowing through your veins. Why, my dear, it makes you both act and appear years younger. It makes you feel you are part of this great 'right up to the clock tick' modern sway of 'things doing.'

"When you are threading your way in and out of the vast swarm of vehicles that congest this great downtown Chicago, in the busy hours, you are bringing into play all your faculties. You must be alert and watchful every moment, careful and calculating in thought and action, courteous and charitable to drivers and pedestrians. In fact, it makes you a broader minded woman in every way. Makes you more self-reliant and gives you a feeling of accomplishment in the knowledge that you are an atom in the history-making of that leading industry, the electric vehicle."

Mrs. Lampard concluded this encouraging array of facts with an earnestness that carried with it conviction and I took advantage of the pause to ask how long it took her to learn to drive an electric car. "I had perfect control of the car and knew everything there was to know about driving it, at the end of one hour," she replied. "I was surprised at the simplicity of it. A child can handle one easily. Let's step into this car here," she proposed, indicating one of the spick and span cars in the showroom where we were seated, "and I'll show you some of its features.

"To begin with, the doors open forward; that's for added safety, for instance, in case you were driving in or out of a garage and your door was open and came in contact with anything, the door would only close instead of being torn off its hinges. It's also more convenient, I think, to open so.

"This is a five passenger car and this seat, here, is the driver's; it's not away off from the other seats, as in some cars where you're practically isolated from the rest of your party. And this is another seat," unfolding one from against the side of the car, elevating its back and pivoting it around to face any direction.

"It can simply be folded out of the way when not wanted. These two bars control the driving," indicating the two black rods at her left elbow. "You place them horizontally, so. This shorter one is manipulated with the left hand and controls the power and you steer with the longer one.

"These two pedals are the brakes and the one between is the power cut off. In a moment of confusion, when one must stop and stop quickly, and excitement makes your hands forget to do the right thing, the natural tendency is to straighten out and brace yourself against something, and with one forward movement of your foot, you press forward all three and automatically bring your car to a standstill. Then you can collect your thoughts, release your breaks and proceed with judgment.

"But the nicest thing in my opinion is the forward drive and a clear vision. With the driver in front, everybody facing forward, and a clear vision on both sides, front and rear—as in this car, on account of it being glass all the way around and no panels to interfere—the safety of both passengers and pedestrians is assured.

"And the entire body is made of aluminum; that is why these cars are so light. The greatest weight they carry is that of the batteries.

"The upholstery and fittings are in such perfect accord and just as elegant as can be. This car is done in such an odd and pretty shade of blue, don't you think? But, of course, the purchaser always has his choice of shade and material.

"We'll step out and I'll show you the location of the batteries. Here they are, under these hoods at each end of the car. There are forty cells in this car. It is possible for a woman to take entire charge of her own car if she has a rectifier in her garage.

"The advantage of having an electric car is that there is no chauffeur disturbance, no tire troubles, no sickening odors and it's always clean," concluded Mrs. Lampard, as we walked back to the divan where we gathered up gloves and hand-bags and things. "One of the salesmen took my car out this morning, but if it's back, I'll take you to the office, if that happens to be your destination," she invited. I assured her it was and accompanied her back to the garage where she found her car and where we met a Mr. Frank, who is the superintendent of the service department. I was surprised to find there every device for prompt and efficient service to their customers, "which is the advantage of buying a car from a branch instead of an agency," explained Mrs. Lampard, as she guided the car between an auto truck and a laundry wagon and past numerous vehicles in the alleyway which ran back of the garage. "Once a month our customers may bring their cars in and have them thoroughly oiled and inspected, gratis.

"Dear me! I thought I had my little book of 'prospects' with me!" It was then I discovered I had forgotten my umbrella, so Mrs. Lampard drove around to the front of the offices and while she got her prospect book out of her desk where she had safely locked it away, I rescued my umbrella from behind the radiator. Before starting, we let down the windows of the car because the rain had stopped and the sun was shining.

It was a short and pleasant drive to Jackson and Dearborn, and, as I alighted and said good-bye to the pretty lady with the blue eyes and hat to match, the rain began to come down in a soft little patter. Mrs. Lampard raised the windows, waved a good-bye and was gone.

Voltage and Capacity of Cells

The voltage of any individual storage cell is not affected by changing either the size or number of plates, or the quantity of electrolyte contained in the jar. It is entirely dependent upon the character of the plates and upon the density and composition of the electrolyte. When a greater voltage is desired than that given by a single cell, the cells are connected in "series," that is, they are arranged so that the entire current passes through all of the cells in succession. This has the effect of adding the individual voltages.

In connecting by the series method, the negative terminal is connected to the positive of the succeeding cell, the negative of the second is connected to the positive of the third and so on throughout the series until all of the cells are connected in circuit. The total terminal voltage between the terminals of the end cells is equal to the product of the number of cells and the voltage of each cell. If the voltage of a cell were taken at 2 volts for example, which is the average voltage of a cell, the voltage of twenty cells will be equal to $2x20=40$ volts.

The capacity of the cell in amperes or ampere hours is proportional to the area of the plates, the number of plates, and the temperature of the electrolyte. Since the capacity of the plates is proportional to the area in contact with the electrolyte, the plates are corrugated so that the greatest amount surface possible is obtained with a given size of plate. Thickness of the plate has but little bearing on its capacity, as the electrolyte seldom penetrates more than 1/16 inch into the active material. If the plate exceeds this in thickness the excess of material is useless, at least as far as the capacity of the cell is concerned. Thin plates give the greatest capacity per pound of cell weight.

The area of the plates may be increased in two ways, by using large plates or by connecting a number of smaller plates in parallel. As plates of a vehicle battery are limited in width and length, it is usual to connect a number of them in parallel, the exact number, of course, depending on the capacity of the battery. Connecting the plates in parallel has the same effect as connecting a number of individual cells by the same system as the internal resistance is reduced in proportion to the increase in area.

In parallel connection all of the plates of like polarity are connected to one lead or terminal, the positive plates being connected to the positive terminal, and the negative plates to the negative terminal.

Experiments are now being made in Sweden with a new form of lead plate that is said to have proved superior to the ordinary gird in regard to the weight per ampere hour of output. Thin lead threads are obtained by squirting the molten metal through dies. The threads are then coated with the active material, and twisted into thick cables which are afterwards compressed into plates by a hydraulic press. By this method a minimum of material is used to obtain a maximum of effective plate area.

When charging a storage battery, make sure that the polarity of the charging current is known, and that it is properly connected to the battery. When charging in a strange station, or when tapping directly from the central station "juice," use a polarity indicator.

Some Facts About Storage Battery Electrolyte

Where Many of Those Mysterious Battery Troubles May Be Located

BY HUDSON F. SMITH

> *The question of an analysis of the storage battery electrolyte concerns those in charge of large fleets of commercial vehicles or large garages that cater to the electric vehicle trade. In such cases the foreman in charge should have as thorough a knowledge of the detection of impurities in the electrolyte as he has of electrical matters, a knowledge, by the way, that is much more easily attained.*

MANY of the troubles ordinarily charged against the battery can be traced directly to impure acid and water used in making up the electrolyte. A combination of "drug store acid" and hydrant water that is impregnated with mineral salts is a certain means of obtaining local action between the plates, with the attendant loss of charge and sulphating of the plates. While the acid need not be of the "chemically pure" grade used by chemists in analytical work, it must be free from the traces of platinum, chlorine, copper, nitrates, and arsenic that are introduced during the manufacturing processes.

In general there are two methods of making sulphuric acid, each one of which introduces impurities peculiar to the materials used in the process. When pyrites is used as the source, as is the case in the manufacture of some acids, quantities or arsenic and iron salts are entrained in the acid which are difficult of removal, even if an attempt were made in this direction by the manufacturers. For this reason the use of acid made from this metallic salt should be avoided. The second process, in which sulphur is used as the base of the acid, produces the purest acid, and with the exception of chlorine rarely contains impurities of an injurious nature.

Platinum, which is by far the most injurious substance, is taken up by the acid when passing through the conducting pipes and stills which are generally lined with this metal. This impurity causes the cells to discharge on open circuit even when the smallest trace is present in the electrolyte, and therefore adds to the danger of sulphating and rapidly wastes the charge. This danger is greatly increased by the difficulty experienced in detecting the presence of the platinum in solution by ordinary chemical tests. Practically the only test open to the layman is to pour a solution of the suspected acid into a cell and watch the results. If the battery gases for some time while on open circuit, it indicates that there is a small amount of platinum present in the electrolyte. While this test is not infallible owing to the fact that there are other causes that will give the same indication, it at least is an index, and should arouse suspicion.

Nearly all water taken directly from rivers or wells contains chlorine, ammonia, and sulphur in addition to the metallic salts. Both the gaseous and metallic impurities combine to form a sludge in the bottom of the cell and attack the active material in the plates. When the sludge thus formed reaches the bottoms of the plates, a partial short circuit is caused that rapidly dissipates the charge and therefore increases the danger of sulphation. Distilled or rain water is the only answer to this problem, and no other should be used in making up the electrolyte. Filtering only removes the floating sand and organic matter and is ineffective in the removal of the most harmful impurities.

With the exception of the test just mentioned, it is a comparatively easy matter for the inexperienced man to determine the presence of the common impurities without the use of complicated chemical apparatus or expensive reagents, since the analysis is qualitative rather than quantitative. Practically all of the materials used may be obtained from the local druggist in sufficient purity to insure accurate results. An ounce of each will be ample.

Ammonia.
Hydrogen peroxide.
Ferrous sulphate.
C. P. Sulphuric acid.
Iron sulphide.

In addition to these materials five grams each of silver nitrate and potassium iodide should be secured. Five or six test tubes, a few feet of glass tubing, and a small Florence flask, or thin glass bottle are the remaining items for the tests.

TEST FOR CHLORINE

Dissolve the five grams of silver nitrate in one-half pint of distilled water, and place in a close stoppered bottle. Dilute the suspected battery acid to about one-fifth of its former density in one of the test tubes, and to this dilute solution add three or four drops of the nitrate of silver solution. If chlorine or chlorides are present the solution will turn to a milky white owing to the precipitation of the silver chloride. Care should be taken not to add too much silver solution, for if this is done, a fine cloud of white powder will form at the bottom of the tube which does not necessarily indicate the presence of chlorine as it is likely to be formed by the nitrate itself.

TESTS FOR IRON

A second dilute sample of the sulphuric acid should be placed in another test tube, and enough ammonia should be added to neutralize the solution. A small amount of hydrogen peroxide should now be added to the neutralized solution, the quantity being about one-thirtieth of the volume of the acid, and should be boiled gently over a gas flame for a few moments. Now add more ammonia until the solution becomes slightly alkaline. If there is much iron present in the acid, a red precipitate will fall to the bottom of the tube.

TEST FOR NITRATES

Place about 50 drops of dilute acid, and add about as much of a saturated solution of a ferrous sulphate solution in a third test tube. Carefully pour about half this quantity of the c.p. sulphuric acid down the sides of the tube, taking care not to shake or agitate the liquid. If nitric acid is present in the battery acid, a thin brownish layer will form between the ferrous and sulphuric acid.

TEST FOR COPPER

When ammonia is added to the dilute battery solution a bluish precipitate will be formed if there is any copper present. When enough ammonia is added so that the solution becomes neutralized, the precipitate is dissolved and the solution turns into a uniform dark blue color.

TESTS FOR ARSENIC

Place a few lumps of iron sulphide in the bottle or Florence flask, and fit the bottle with a stopper into which a short bent length of the glass tubing is inserted. Remove the stopper and pour a little of the concentrated acid into the bottle and immediately replace the stopper, inserting the outer end of the glass into a warm dilute solution of the battery solution. If a yellow precipitate is formed in the battery solution by the gas bubbling through it, it is likely that there is arsenic present.

After making the above tests always make a practice of thoroughly cleaning out the test tubes and bottles, as any trace of the salts left from the previous determination will vitiate the results of the test. Use only distilled water in making the tests, for hydrant water usually contains enough of the salts to give false indications.

MIXING THE ELECTROLYTE

The heat generated by mixing sulphuric acid and water decreases the density of the electrolyte, and for that reason the readings of the hydrometer must be corrected when the instruments are used in a fresh solution. This change in density amounts to 0.0032 for every degree Fahrenheit above the normal temperature of 60 degrees. The temperature should, of course, be taken at the same time that the hydrometer is read. If a thermometer is not available, the solution should be cooled to the normal temperature before the readings are taken.

The resistance of the electrolyte varies with its specific gravity and temperature. The resistance is at a minimum at a specific gravity of 1.224, or when the percentage of acid is 32 per cent of the total volume. The resistance is reduced by an increase in temperature, this being just the reverse of the case of metals.

In the usual forms of construction, the normal discharge of a cell per square foot of superficial area amounts to from 8 to 12 amperes. The area in this case is taken as the width multiplied by the length, multiplied by two.

When the cell is left idle the charge is gradually lost through faulty insulation or through local action, and if left long enough it will fully discharge and sulphate. Frequent charges should be given as long as the electrolyte remains in contact with the plates. An impure electrolyte or sediment in the bottoms of the cells greatly increases the rate of leakage.

SULPHATION

When the battery is discharged to a low point, the electrolyte reduces the active material on the plates to lead sulphate. The sulphate is pure white, forming a distinct contrast to the dark colored plates, and may easily be seen if present in any quantity. As this coating is a non-conductor of electricity and is insoluble in the electrolyte it reduces the capacity of the cell in proportion to the quantity present.

When the pores in the active material are filled with lead sulphate, the great expansion of the salt loosens the active material and allows it to fall from the supporting grids. The force of the expansion is often the cause of "buckling" or the distortion of the grids, and in many cases the grids are actually fractured by the stresses brought upon them by this action.

Internal short circuits are generally caused either by buckled plates or an accumulation of active material at the bottom of the cell. The latter trouble is the result of sulphation by prolonged overcharges or short circuits extend to the cell.

Keep the battery cells cleaned out, and remove the sediment frequently from the bottoms of the cells.

Amended Insurance Rates

On April 1, the amended automobile insurance rates covering loss by fire and theft went into effect all over the United States. The new rates show a reduction on all classes of cars, the greatest being on the new and higher priced machines. There was a slight increase on the old and factory rebuilt cars, the rates increasing as the car decreases in value from age or hard use.

The new rates on gas cars are divided into two classes, the first class including the 1912, 1913 and 1914 models in the hands of the original owners. The second class covers the second hand cars and the older cars still in the possession of the original owners. In class one, the cars costing $3,500 dollars or more start on a basis of 1⅝ per cent on the original cost. The rates from this point increase as the cost decreases. Cars costing from $1,500 to $3,500 start on a base of 2 per cent, and those whose original value is between $700 and $1,500 are based on 2⅜ per cent.

In class two, the rate is 2¼ per cent on cars having an original cost of $3,500 to $6,500, 2¾ per cent from $1,500 to $3,500, and 3⅛ per cent on cars between $700 and $1,500. The rates increase with a decrease in value as in the first class, with a maximum of 4⅞ per cent, when the car is regarded as an uninsurable risk from the standpoint of the underwriters. The rates only apply to private pleasure cars and commercial racers.

The electric cars have a much lower rate, being 1½ per cent for any amount, or 1⅜ per cent without the theft clause. If the cars are used for carrying paid passengers an addition of one per cent is made. Collision damages are computed at 2 per cent of the original cost, with a minimum of $28 and a maximum of $200.

Electric Vehicle Battery Proved Strong

In the ruins of the Omaha Electric Garage, a Detroit electric roadster was found buried under tons of wreckage. The car had belonged to the Omaha Electric Light and Power Company. When the debris had been removed and the battered remains of the car hauled out, the battery of forty Edison alkaline cells was found to be uninjured, though the forward metal hood over the battery had been crushed in, causing the cells to be short-circuited and the connecting jumper cables to be burnt off. Individual cell readings were taken later and it was found that neither the short-circuiting, the weight of the falling wall nor the resultant neglect of the battery had been injurious to so much as one cell, and even the electrolyte was at practically its normal gauge. This is but one example of the sturdiness of modern electric vehicle equipment.

Teamsters Train for Motor Vehicle Operators

That the trade union is doing much to educate the teamster of today to be the power-vehicle operator of tomorrow, was the contention of Daniel J. Tobin, general president of the International Brotherhood of Teamsters and Chauffeurs of America in a recent talk before the Electric Vehicle Association of America, in New York. "The Power-Wagon Driver," was Mr. Tobin's subject and in voicing the sentiments of the teamsters, he refuted the belief that the teamsters are opposed to the introduction of electric and gasoline vehicles in place of horse-drawn wagons; on the contrary, he stated that they believe in the necessity of the motor vehicle.

Children Benefit By Electric Car

Not the least beneficiaries of the adoption of the electric pleasure car by society are the children of the family.

Primarily, it was for the mother's use that the machine was bought, but, like most everything else that is hers, the pleasure it gives is shared with the children.

Originally, she planned to use the car for her shopping, for her calls and little runs into town for matinees or bridge parties.

But soon she finds that it has great availability in ministering to the conveniences of her youngsters. On rainy days she can send them to school or to the railroad train in the ever-ready electric, and no condition can arise to block this plan, for no chauffeur is required. She herself can drive the machine and she has no fears of any difficulties she may encounter while controlling its movements.

Especially for the "party," whether afternoon or evening, or the dancing class is the electric machine a useful means of child transportation.

It is not to be forgotten that a host of little affairs like these are designed for the pleasure and the development of the children of persons of means.

Before the youngsters are very old, boys or girls can run the car themselves, and in a large number of instances they are permitted to do so because the simplicity of construction, absence of cranking and facility of management make it a matter of no risk to trust the piloting of an electric to a fair-sized and reasonably bright boy or girl.

Boston Women Falling Into Line

Boston women are following the example of women in the middle western cities in adopting the electric motor car for their personal goings about, and since the season for golf-and tennis opened, it has been remarked that an increasing number of women players and visitors appear at the various country clubs driving their own electrics. In most other cities the women have long recognized in the electric a vehicle peculiarly well adapted to their requirements, but Boston women have been so accustomed to long-distance travel by motor car, that they have not until recently become aware of the great advantages of the electric for their ordinary day to day travel in and about the city.

Visits to Washington, Philadelphia, Chicago, Cleveland and other cities where electrics are in very common use, seem to have shown Boston women that they are losing much of the fun and convenience of motoring in not having their own electric cars. In those cities women do not think of taking out a large touring car either by themselves or with a chauffeur, if they have occasion to make a trip down town, a run to a country club or for an afternoon ride. They have their own electric runabout or phaeton, which they can handle without assistance, and which they find much more convenient to drive wherever they happen to be going and keep with them until they choose to return, than the touring car with the chauffeur who must either be kept waiting or must be sent away with some definite time fixed for his return.

This tendency of women to use electrics is much in line with the disposition that is evident in all sorts of motoring, to adopt the type of car that is best fitted for individual needs.

Aside from its suitability in this way the electric is adapted to women drivers from the fact that it is clean, simple, and with the minimum amount of garage attention constantly ready for use. Furthermore, it has a style that appeals strongly to women. The electric may be used for practically any purpose except long-distance travel and it is even capable of making long trips, though it is not generally employed for that kind of work. With an electric in the garage a woman who wishes to make a trip to the country club has simply to step aboard with her golf sticks or tennis racquet, switch on the current from the battery and drive away; she need not worry about any complications of mechanism, and she will not deprive the rest of the family of the use of the big car.

As a part of the equipment of country homes, electrics are coming to be recognized in Boston as quite as necessary as the large car. There are a great many times when a car is needed for a quick trip to the station, to the club, to a neighboring estate, or even in town. A car of large carrying capacity is unnecessary and is often not convenient, if the woman of the house hapepns to be the one who desires to make the trip. For this sort of thing the electric just fills the bill. Boston and vicinity is better adapted for the operation of electric cars than many other cities where they are much more numerous.

Oregon Offers Profitable Electric Field

Electric car dealers may look for a well defined sales increase from now on in Portland and vicinity, providing D. B. Rose has sized up the situation correctly. Through the prophetic gaze of the Western representative of the Ohio Electric Car Company is seen a marked change in the business in that district. In predicting a big growth during the coming year, Mr. Rose does so with a thorough knowledge of the field. He is familiar with Portland conditions through long observation and personal investigation, and knows whereof he speaks.

In assigning cause for Portland's wealthy people failing to show a predilection for the fancy, luxurious electric, Mr. Rose declares that they have not yet learned how to unloosen their purse-strings in providing for life's luxuries.

However, he professes to see a marked change in their attitude and enthusiastically says that since they have started on the electric car question, there is no telling where they will end. He points out numerous reasons why Portland should be the best electric car city on the Pacific coast.

"I have watched closely the progress of the electric car dealers in Portland," said Mr. Rose. "I could appreciate the handicap they were working under. There seems to be a prejudice existing against our type of automobile. But their objections will have been completely overcome in another year or two.

"I am surprised to learn how bright the prospects really are. The dealers should sell half as many cars during this year as there are in operation in Portland now. The fever is spreading to the larger towns of the state.

"I have talked with a number of motorists who own high-grade machines. Their attitude has changed completely. A year ago you couldn't talk electric car to them. They didn't want to buy, and wouldn't even consider the proposition. Now it is vastly different. They are interested. They are going to buy. They are taking notes on the various electrics in operation and their choice will be influenced largely by the advice of their friends who own electrics."

There are more than 1,500 electric pleasure cars in Los Angeles, according to Mr. Rose. He says that Portland's climate is far more suited to the use of the electric than the Southern California metropolis.

"And Portland has just as many wealthy permanent residents," he continued. "Portland should have just as many electrics as Los Angeles. In a few years I think the two cities will have about an equal number."

Mr. Rose takes anything but a pessimistic view of the California situation.

"Why, the Ford people alone will sell 5,000 cars in California this year," said Mr. Rose. "And Don Lee will dispose of at least 1,000 Cadillacs. The Buick, Overland, Studebaker, Chalmers, Hudson and other cars are selling in greater quantities than the agents ever dreamed of.

"The automobile dealer virtually crawls into his shell in Winter—but not so in California, especially in the southern district. There the selling season lasts twelve months every year. The majority of the distributors for well established automobiles cannot get enough cars to fill the demand.

"Good roads have been a great help to the automobile men, as well as to the state generally. When the movement for better highways begins to bring results in the Northwest, the automobile business will increase proportionately."

Augments Gas Car Line With Electrics

Because of the increasing demand for electric vehicles, both pleasure and commercial, in Northern California, the Pacific Kissel Kar branch has decided to augment its gas car lines with a complete assortment of Baker electrics, which will be distributed throughout the state.

The local branch will have the disposition of all Bakers north of Santa Barbara county and east to the state line, while the branch in Los Angeles will take care of the entire southern territory.

O. B. Henderson, sales manager of the pleasure car department, and George H. Kelly, sales manager of commercial cars of the Baker Electric Company, after having made an extensive canvass of the state and finding conditions of such a promising nature, got in touch with President W. L. Hughson of the Pacific Kissel Kar branch, with the result that a deal was consummated whereby the local branch will represent electrics throughout California.

Speaking of the arrangement, Hughson says:

"I am convinced that there is, and will be, a growing demand for electrics. Our efforts, heretofore, have been toward the development of electric car business in the southern part of California where the demand has created a very profitable market, but after a conference with Henderson, who is conversant with electric vehicle conditions all over the country, I am positive that conditions are equally as promising in the north.

"We propose to back up our faith in this new field by carrying a complete assortment of all models made by the Baker Company, and will establish an electric service department second to none in this country, which will be at the disposal of every Baker owner at all times. A network of agencies will at once be organized throughout the state and a campaign immediately started which will put the buyer in intimate touch with the many advantages. John H. Eagal, one of the best known automobile men on the Pacific Coast, has been appointed manager of both the pleasure and commercial car lines.

Predicts Great Future for Electric Car

The most radical change and transition in the vehicle world took place when self-propelled vehicles became a part of our transportation facilities, says G. A. C. Halff in the San Antonio, Texas, *Express*.

Cleveland is one of the extraordinary popular electric vehicle towns in the world. The position of the electric here is due to the nearly perfect conditions regarding charging and traffic conditions. This has been the reason for the wonderful growth of the electric in Cleveland. In due time all other cities of the United States will follow.

The future of the electric pleasure car will be wonderful—wonderful because its refinement augur for it the eventful car. Electricity each day is becoming more and more a part of our daily needs. Progress in the electric field has been so remarkable within the last five years that in another period of similar length there is a possibility of using this power for hundreds of other purposes. Each day we are more successfully harnessing it, until it is only a matter of time before practically everything will be driven by electricity. The electric vehicle will be the car for the future because it lends itself more nearly to driving conditions than would be possible with any other method of propulsion. While this may appear to be a vital point, the source of supply for propelling the vehicle can be more easily, more cheaply and more logically secured than other fuels. We are an ease-loving nation, and because of it the electric appeals. We want to derive as much pleasure and benefit out of our conveyances without necessitating the expenditure of effort. We like to feel that our wishes are fulfilled with the least outlay of energy. The average person's idea of the operation practically tallies with the effort expended in pushing a button.

Battery Charging a Paying Specialty

More attention is being given battery charging by central stations, since the popularity of electrical vehicles, both of the pleasure and commercial varieties, has increased so markedly. Battery charging has developed into a prime source of revenue, in place of the secondary place it formerly occupied. One electric company earned $150,000 last year from this service alone and the work of charging batteries is reaching the aspect of a specialty to be in charge of qualified experts who will give service throughout the twenty-four hours rather than just when the central station meters do not indicate the peak load.

A Bailey Completes a Long Trip

On May 5, a Bailey roadster, aged three and one-half years, ran from Boston to Springfield, thence to Holyoke, and back to Springfield on one charge of battery. The total distance was 114.7 miles. The distance from Boston to Springfield, which is 93.4 miles, was covered in 4 hours and 55 minutes. Edison cells were used on the trip, the standard equipment of the Bailey electric.

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This publication is free and independent of all business or house connections or control. No manufacturer or supply dealer, or their stockholders or representatives, have any financial interest in Electric Vehicles *or any voice in its management or policy.*

CHICAGO, MAY, 1913

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STARTING "ELECTRIC VEHICLES."

THIS is not a "salutatory"—or at least we will not call it that. It is an introduction to the first number of Electric Vehicles, which is also the first number of any magazine specializing on electric automobiles, pleasure and commercial.

The general automobile field is already well provided with trade papers or "class journals," which range all the way from the purely technical engineer's paper to the wholly popular newsstand magazine. We do not recall offhand the exact number of these publications, but there are so many that a publisher must needs be aggressive indeed to start a new one.

But it is well known that the general automobile publications have given scant consideration to the electric vehicle, and have taken little opportunity to present its literature to the buying public. That is the reason for bringing out Electric Vehicles, and that is why this paper is not in competition with any other automobile paper. It is distinctly a new publication in a new field, which, already large, is growing larger with extraordinary rapidity.

Today the electric automobile occupies a very important place in industrial and social life. It has gained in efficiency during the past five years until it is as useful to the suburbanite as to the town resident. While the electric was first considered as strictly a woman's car, and without claim to speed or endurance, it is rapidly being adopted by business men who already are the owners of gas cars. The man who formerly considered the electric as effeminate is now one of its warmest advocates. Both the public and those dealers who are not enlightened as to the benefits and present status of the electric owe it to themselves to become acquainted with its many advantages.

The old objections raised against the electric, that it would not climb hills, would not give enough mileage, or would not negotiate country roads, are no longer true. It has ceased to be merely a town car, for many of the machines now on the market can cover between 90 and 100 miles on a single charge. All of them are fast enough to keep pace with the gas car in districts where proper traffic and speed laws are enforced. With a radius of from forty to fifty miles, the electric meets all of the demands of the average owner who makes but few trips exceeding 100 miles. To the suburban resident who lives twenty miles or so from the heart of the city, the electric offers every possible inducement as a means of daily transportation to and from his place of business.

The gasoline car has a legitimate field quite distinct from that of the electric, and there is practically no competition between the two. One really supplements the other. The dividing line between the two types of cars is even more clearly defined in commercial truck service, where accurate account is kept of the operating costs per ton mile. For short hauls, or in cases where the truck is to be loaded or unloaded frequently, the electric is far more efficient and successful than the gas car, and in the occasional instances where the two have become competitors the electric has usually emerged with flying colors.

An electric pleasure car may be driven by any member of the family, and therefore removes the necessity of

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There are no bonds, mortgages or other securities outstanding against ELECTRIC VEHICLES.

ED J. MOCK, *Business Manager.*

Sworn to and subscribed before me this thirty-first day of March, 1913.

(Seal) Leona J. Ekstrom.
My commission expires Aug. 17, 1914.

a chauffeur or attendant. As change gears are eliminated, it is pliant in its action and especially adapted for travel in the congested districts of large cities, where the constant manipulation of the gear lever is not only tedious but dangerous to the operator. Anyone who has the mechanical ability to move a small, single control lever back and forth in its sector can operate an electric vehicle. The problems incident to the spark and carburetor controls are conspicuous by their absence.

Undoubtedly the ease with which an electric is started has been one of the reasons of its popularity with women, few of whom are strong enough to turn over a heavy gasoline motor. It eliminates the danger of broken arms through an accidentally advanced spark in starting the motor and avoids the necessity of wading in the mud to the front of the car and to the crank. While the recently devised self starters have been applied to the majority of gas cars, they are by no means infallible in their action, and in addition greatly increase the complication of an already intricate mechanism. The electric is always ready to start at the first move of the controller, and without soiling the hands or ruffling the temper.

No better evidence can be given as to the hill climbing ability of the electric than to state that many hundreds of these vehicles are in use in Kansas City, Pittsburgh, and Seattle, where there are many steep and tortuous hills to negotiate. The fact that 40 per cent of these electric cars were bought during the past year speaks well for the modern vehicle battery.

Since the introduction of the electric in 1895, more than $30,000,000 worth have been sold, one-third of that amount having been disposed of in the last year. From statistics obtained from 25 of the largest distributing points in the United States it is found that from 25 to 60 per cent of the cars running in these localities have been put in commission during the last 18 months. It is likely that no industry ever developed with the rapidity of the electric vehicle trade, and the makers have every reason to be optimistic over the outlook.

We have already pointed out that the automobile papers catering to the gasoline car users have made little or no attempt to present the literature of the electric car. That there is such literature, as interesting and valuable as that of the gas car, a glance through the pages of Electric Vehicles will show.

The gasoline car is the foundation of a tremendous industry, whose representative journals compete strenuously in their devotion to it. Their enthusiasm over brilliant sporting activities, big engines and high speeds, wholly diverts their interest from the safe, reliable, economical electric. Such publicity matter relating to electric cars as is grudingly given space is largely dependent upon the advertising patronage of those specific manufacturers mentioned.

It is rather remarkable, under the circumstances, that the electric vehicle has had no journalistic exponent until now. Few industries of its size have remained so long unprovided for in this respect. Unusual rapidity of development is the only explanation for this condition. Now the electric car is established. It has become a necessary adjunct to society and commerce. And to its activities, in turn, has become necessary a journal of record, an outlet for the rapidly multiplying literature of the industry. Here is where Electric Vehicles steps in, with the earnest desire and purpose to make its pages adequately represent a great and dignified industry.

GASOLINE AND ELECTRICITY

When the automobile first came into use, gasoline could be obtained for ten cents per gallon, for at that time the fuel was practically a worthless by-product in the manufacture of kerosene. Today, the conditions are reversed, for the scanty motor distillate contained in the crude oil is in greater demand than the kerosene, and as a result, the price has steadily climbed until it now reaches 25 cents in some of the larger cities.

As the gasoline forms but from 10 to 12 per cent of the volume of the crude oil, there is but little prospect of a reduction in price. Every gallon of gasoline means that four gallons of oil are produced for which there is but little demand. Eventually an engine may be designed that will use kerosene successfully, but this of course does not help present conditions, or even those in the near future. In addition to the cost of fuel, the gas car uses a much greater quantity of expensive lubricating oil than the electric and requires the frequent renewal of expensive accessories such as spark plugs, piston rings, etc., not found on the electric.

In the case of the electric automobile, the rates charged for charging current are continuously decreasing as the central stations grow larger and more efficient. Since the cars may be charged during the night and early morning hours when the load on the station is at a minimum, it is probable that the present rate will be cut still more when the cars are plentiful enough to appreciably flatten out the "peak load" of the station. The entire tendency of the electric car is toward a lower operating cost. Any load such as the electric car that allows the central station to run the entire day under normal operating conditions, reduces the overhead charges of the plant and therefore makes is possible to reduce the cost of current to the owner of the electric vehicle.

While it is true that the vehicle batteries of five or six years ago were not satisfactory, there is no longer any reason for criticism against the electric in that regard. The same argument may be leveled against the gasoline car with perfect truth, for who does not remember the trials and tribulations of the gasoline car of the same period? Batteries are fully as reliable as the ignition system of the gas car, and are far less complicated and difficult to handle.

Up-Keep Cost, Horse-Drawn vs. Electric Vehicles

Paper Prepared for the American Society of Mechanical Engineers

BY W. R. METZ

> *A great deal has been written on the subject of motor trucks versus horse-drawn vehicles, but it appears to be extremely difficult to obtain exact figures, as most firms regard the item of hauling as an overhead expense not worthy of the minute examination given to the other departments. The motor-driven vehicle is unquestionably cheaper to operate than is the horse-drawn vehicle where a number of vehicles are used, and, in the opinion of the writer, the only question to be determined is the advisability of using electric or gasoline-driven machines. From figures on hand, it appears that the cost of upkeep of the gasoline-driven machines is about double per mile that of the electric-driven machine (not including driver's or helper's wages). The gasoline-driven machines have a larger radius of operation, and, in certain cases, this would offset the cheaper upkeep expense of the electric-driven machine. As a general proposition, it appears that the electric-driven machine is better for city service where the streets are in fairly good condition, and that the gasoline-driven machine is better for long hauls over rough roads and in the open country, mainly on account of the ability to obtain gasoline and water, and the chances of making greater speed.*

DURING the fall of 1910 the writer and the accountant of our office were instructed to submit a report as to the desirability of purchasing motor trucks to replace horse-drawn wagons, and an investigation was immediately undertaken covering certain government departments and private firms. This report was submitted in November, 1910, and it was estimated that the office would save approximately $11,000 per annum if electric vehicles were purchased and all of the horse-drawn equipment sold.

2. This report was approved and equipment purchased as outlined herein, and the results were most gratifying as the saving during the first year was nearly $12,000, in spite of the fact that, during this year, only a part of the electric truck equipment was purchased and six horses were kept. Five of these horses have since been sold, and the saving during the next year will undoubtedly be increased.

TABLE 1. 2,500-LB. ELECTRIC TRUCK.

Cost of truck	$2,230.00	
Labor for charging batteries		$ 46.44
Charging		16.50
Acid		18.00
Rubber jars		15.00
Batteries (partly renewed)		64.98
Carbon brushes		1.80
Repairs		99.96
1 operator at $2.48 per day		776.24
2 laborers at $1.92 per day each		1.201.92
Totals	$2,230.00	$2,240.84
Depreciation 10 per cent		223.00
Interest on investment at 2 per cent		44.60
Total cost		$2,508.44
Total mileage per year	3,366	
Cost per mile	$0.745	

This truck displaced 5 horses and carts, costing as follows:

5 carts by contract at $1.92 per day	$3,004.80
5 laborers at $1.92 per day each	3,004.80
Total	$6,009.60

Net saving of truck over horses per year, $3,501.16.

PRELIMINARY INVESTIGATION

3. The naval gun factory at Washington operated five electric trucks, two of which had been in operation for four years; one of these had a capacity of 2,500 pounds, and the other a capacity of 5 tons. The first was furnished by the McCrea Motor Company of Ohio, and the other by the Studebaker Company. The cost of operation and the saving accomplished were as given in Table 1.

FIVE-TON ELECTRIC TRUCK

4. The cost of operating this truck was about the same as the 2,500-pound wagon, excepting that the 2,500-pound wagon cost 75 cents for charging per 40-mile radius, while the 5-ton truck cost $1.10 for the same radius. The total cost of operation is given as $2,396.84, and if depreciation and interest on the investment of $3,725 are included the total cost will be $2,843.84 as will be seen.

5. This truck displaced two 2-horse wagons costing as follows.

In this case depreciation and interest are not included as the original cost of the horses was not known:

3 laborers, each wagon, at $1.92 per day	$3,605.76
Stabling, shoeing, etc., 4 horses at $4 per day	1,252.00
Total	$4,857.76

Net saving of truck over horses, $2,460.92.

6. One large company operates a number of horse-drawn wagons, also a number of motor trucks, both electric and gasoline driven. Their experience is given in Table 2.

7. From Table 2 can be estimated the yearly expense of vehicles requiring more than one horse, by adding the items for horses and harness to the one-horse vehicles costs as follows:

1-horse vehicle expense		$ 464.81
Vehicle and 2 horses expense	$464.81 plus $275.71	740.52
Vehicle and 3 horses expense	$740.52 plus $275.71	1,016.23
Vehicle and 4 horses expense	$1,016.23 plus $275.71	1,291.94

8. In Table 3 are given the costs of operation for the electric trucks used by this same company. Table 4 compares the operation costs of the first two trucks recorded in Table 3 on the basis of 300 days' service per year. Table 5 makes a similar comparison of the commercial and individual gasoline machines, assuming 300

TABLE 2. HORSE-DRAWN VEHICLES.

Investment—		
1 horse	$250.00	
1 vehicle	125.00	
Harness	30.00	
Total	$405.00	
Maintenance and upkeep—		
Depreciation:		
Horse at 20 per cent	$ 50.00	
Vehicle at 15 per cent	18.75	
Harness at 15 per cent	4.50	
Interest on $405 at 6 per cent	24.30	
Total		$ 97.55
Horse upkeep—		
Feed at 47.4 cents x 365 days	$173.01	
Shoeing at 7.5 cents x 365 days	27.38	
Veterinary at 1.1 cents x 365 days	4.02	
Total		$204.41
Vehicle expense at 43.4 cents per day	$158.35	
Harness expense	4.50	
Total		162.85
Total expense exclusive of labor and stable		$464.81

TABLE 3. EXPENSE OF OPERATING ELECTRIC COMMERCIAL VEHICLES.

Capacity, lb.	850-1000	1500-2000	2500-3000	4000	7000
Interest and depreciation (machine less batteries and tires)	$244.50	$306.30	$391.40	$ 422.94	$ 470.84
Mechanical and electrical upkeep	67.54	84.15	101.70	110.96	121.42
Tire repairs and renewals	79.28	97.30	155.05	267.60	535.25
Battery repairs, cleaning and renewals	130.50	175.36	219.34	271.54	312.84
Current at 1 cent per kwhr.	20.00	30.20	40.00	60.00	51.50
Totals	$541.82	$693.31	$907.49	$1,133.04	$1.491.85

TABLE 4. TOTAL MILEAGE OF THE FIRST TWO CARS, AND THE COST PER MILE OF EACH EXCLUSIVE OF INTEREST AND DEPRECIATION.

Capacity, lb.	Miles per day	Miles per year	Cost per year	Cost per mile
850 to 1,000	25	7,500	$297.32	$0.04
1,500 to 2,000	25	9,125	277.01	.03

TABLE 5. COST AND MILEAGE OF COMMERCIAL AND INDIVIDUAL MACHINES.

Service.	Miles per day	Miles per year	Total cost per year	Cost per mile
Commercial	22.2	6,660	$896.69	$0.135
Individual	19.7	7,190	809.53	0.1125

TABLE 6. COMPARATIVE EXPENSE OF OPERATING MOTOR VEHICLES IN PLACE OF HORSE-DRAWN VEHICLES.

Vehicles for emergency work—		
Two 2-horse vehicles at $740.52	$1,481.04	
One 3-horse vehicle at $1,016.23	1,016.23	
		$2,497.27
One 4,000-lb. automobile	$1,133.54	
One 2,500-lb. automobile	907.49	
		$2,040.53
Annual saving by use of automobiles, not including labor		$ 456.74
Supply wagon—		
One 4-mule wagon	$1,291.94	
One 4,000-lb. automobile	1,133.04	
Annual saving		$ 158.90
Paymaster's money wagon—		
One 2-horse vehicle	$ 740.52	
One 850 to 1,000-lb. vehicle	541.82	
Annual saving		$ 198.70

TABLE 7. EQUIPMENT, NUMBER AND CLASS OF MEN EMPLOYED, AND COST OF OPERATION, MAINTENANCE AND REPAIR FOR HORSE-DRAWN VEHICLES FOR YEAR ENDING JUNE 30, 1910.

Equipment.	Cost.
23 horses (average per year)	$ 6,900.00
Harness, blankets, etc	1,350.00
1 five-ton truck (2 horse)	425.00
7 large delivery wagons (2 horse at $475.00 average)	3,325.00
6 single delivery wagons (1 horse at $275.00 average)	1,650.00
3 light mail wagons at $200	600.00
4 depot wagons (carriages) at $300	1,200.00
2 coupes, with pole and shafts, at $540	1,080.00
Total	$16,530.00

Number and class of men employed:

Stable Section.	Delivery Section.
1 foreman at $2,000 per year.	1 foreman at $2,000 per year.
1 mail carrier at $3.20 per day.	4 helpers at $3.04, $2.80, $2.72 and $2.40 per day.
1 messenger at $2.40 per day.	12 messengers at $2.40 per day.
11 drivers at $2.40 per day.	2 unskilled laborers at $2 per day.
1 stableman in charge at $2.88 per day.	
8 stablemen at $2.40 per day.	

Total employes* in both sections—42.

Cost of operation of stable section—	
Wages of foreman and stablemen	$10,113.59
Wages of drivers	12,666.21
Rent	2,400.00
Feed	3,172.20
Supplies	959.62
Repairs to harness, wagons, etc	626.86
Shoeing	906.60
Gas and electricity	268.50
Total cost of operation, maintenance and repair	$31,113.58
Depreciation, horses 20%, harness 15%, wagons 10%	2,410.50
Interest on investment at 2%	330.60
Total cost, including depreciation and interest on investment	$33,854.68
Cost of operation of delivery section—	
Salaries and wages	$17,085.93
Material and supplies	8.00
Total cost	$17,093.93

---

*Twenty per cent additional is allowed for night service.

TABLE 8. COST PER YEAR OF ONE 2-HORSE, 5,000-LB. CAPACITY WAGON.

Wagon expense—			
Cost of truck	$ 425.00		
Cost of maintenance and repair		$ 31.75	
Cleaning and washing		66.76	
Lubricants		1.00	
Depreciation, estimated at 10%		42.50	
Total			$ 142.01
Horse expense—			
Cost of two horses	$ 615.00		
Cost of feed		$264.33	
Cost of care (hostler)		702.60	
Cost of veterinary and office labor		250.10	
Cost of medicine		2.17	
Cost of shoeing		78.84	
Cost of blankets, nets, etc	12.22		
Rental value of space (2 horses) (based on $2,400 for 22 horses		218.00	
Depreciation, estimated at 20%		125.44	
Total			$1,641.48
Harness expense—			
Cost of harness	$ 123.00		
Cost of maintenance		$ 7.68	
Depreciation, estimated at 15%		18.45	
Total			$ 26.13
Miscellaneous supplies		$ 10.00	
Drivers' wages		751.20	
Helpers' wages		751.20	
Gas and electricity		23.34	
Interest on investment at 2%		23.50	
Total			$1,559.24
Total original cost	$1,175.22		
Total expense for one year			$3,368.86

TABLE 9. EQUIPMENT AND NUMBER AND CLASS OF MEN NOW EMPLOYED.

Equipment—		
Two 1,000-lb. trucks	$ 4,639.00	
Two 2,000-lb. trucks	5,498.78	
Three 5,000-lb. trucks (two in use during full year)	10,625.22	
One 8,000-lb. truck (installed in January, 1913)	5,509.00	
One electric-driven carriage (installed in November)	3,671.00	
Total cost		$29,943.00
Number and class of men employed—		
1 foreman at $2,000 per year	$ 2,000.00	
12 chauffeurs at $2.40 per day each	9,024.40	
3 helpers at $3.20, $2.80 and $2.72 per day	2,729.36	
10 messengers at $2.80 (two) and $2.40 (eight) per day	7,762.40	
1 mail carrier at $3.20 per day	1,001.60	
2 messenger boys at $1.20 each per day	751.20	
1 stableman in charge at $4.00 per day	1,252.00	
3 stablemen at $2.40 each per day	2,253.60	
2 drivers at $2.40 each per day	1,502.40	
35		$28,276.96

Note—Labor charge is based on day service.

TABLE 10. SALARIES, WAGES, LEAVE OF ABSENCE, HOLIDAY AND LIABILITY PAYMENTS, MATERIAL AND SUPPLIES, REPAIRS, ETC., FOR DELIVERY, STABLE AND GARAGE, JANUARY 1 TO DECEMBER 31, 1912.

	Salaries, wages, leave of absence, holiday and liability payments			Material and supplies, Repairs, etc.		
Month—	Delivery	Stables	Garage	Delivery	Stables	Garage
January	$1,429.23	$523.71	$818.23	$14.75	$149.85	$223.87
February	1,330.59	465.88	822.56	2.74	127.06	224.89
March	1,345.76	487.61	828.97	2.28	189.36	240.67
April	1,245.10	484.17	891.61	13.51	76.21	197.08
May	1,378.52	543.23	1,019.64	25.55	114.27	183.87
June	1,141.73	453.61	821.78	66.96	213.18	495.99
July	1,454.96	512.77	887.06	9.40	124.35	173.57
August	1,372.38	447.99	889.27	6.00	127.84	251.64
September	1,487.09	429.50	678.68	4.34	122.55	198.60
October	1,391.65	443.33	710.59	9.94	129.54	307.26
November	1,565.02	337.95	809.68	1.35	57.76	222.40
December	1,460.70	252.00	910.13	13.95	48.81	203.41
Total	$16,602.73	$5,381.75	$10,088.20	$170.77	$1,480.78	$2,923.25
Equipment issued January 1 to December 31, 1912				$70.00		$24,446.00

TABLE 12. COST OF OPERATING ONE 5,000-LB. ELECTRIC TRUCK.*

Cost of truck and equipment (including spare battery and parts)	$3,745.00	
Maintenance and repair (as per statement above)		$581.53
Depreciation at 10%		374.50
Interest on investment at 2%		74.90
Chauffeur's wages at $2.40 per day		751.20
Messenger's wages at $2.40 per day		751.20
Total original cost	$3,745.00	
Total expense for one year		$2,533.33

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*One of these electric trucks easily replaces two 2-horse trucks.

TABLE 11. ELECTRIC VEHICLE RECORD.

	1,000-lb.			2,000-lb.			5,000-lb.		
	Jan.-June	July-Dec.	Total	Jan.-June	July-Dec.	Total	Jan.-June	July-Dec.	Total
Total miles	3,013.00	3,511.00	6,524.00	2,978.00	2,864.00	5,842.00	3,586.00	2,918.00	6,504.00
Ampere hours	8,598.00	8,459.00	17,057.00	11,019.00	9,710.00	20,929.00	18,302.00	14,096.00	32,398.00
Ampere hours per mile	2.85	2.40	2.61	3.69	3.39	3.58	5.10	4.83	4.98
Kw-hr. supplied	1,249.8	1,303.80	2,553.6	1,573.6	1,389.4	2,963.00	2,678.4	2,047.8	4,726.2
Cost of current	$14.67	$16.64	$31.31	$18.58	$17.79	$36.37	$31.56	$26.28	$57.84
Battery upkeep	......	......	......	......	......	......	......	......	......
Tire upkeep	......	......	......	......	......	......	......	......	......
Electrical upkeep	1.20	2.93	4.13	0.75	14.38	15.13	5.06	8.67	13.73
Mechanical upkeep	26.80	27.68	54.48	41.34	28.41	69.75	129.62	80.10	209.72
Inspection	161.58	138.67	300.25	161.58	138.67	300.25	161.58	138.66	300.24
Totals	$204.25	$185.92	$390.17	$222.25	$199.25	$421.50	$327.82	$253.71	$581.53

days' service per year for the former and 365 days for the latter. The following makes of gasoline cars were in use: Cadillac, Brush, Buick, Ford, Franklin and Maxwell, ranging from 10 horsepower to 30 horsepower.

9. In addition to the records obtained from this company, the attempt was made to secure data from a number of private firms, but unfortunately none of them had any exact figures and could only approximate the savings due to the use of both electric and gasoline-driven trucks over horse-drawn vehicles.

VEHICLES IN USE BY OUR OFFICE.

10. During the fiscal year 1910 and 1911, which were the last two years that horse-drawn vehicles were used exclusively, the total expenses for the stable were $31,113.58 for 1910, and $31,231.93 for 1911; and for the same years the cost of the delivery section was $17,093.93 for 1910, and $17,256.19 for 1911, making a total cost for the delivery and stable sections of $48,207.51 for 1910, and $48,488.12 for 1911. It should be stated here that the stable and delivery sections were entirely separate at this time, each being in charge of a foreman, whereas after the automobiles were used these sections were combined, although the costs were separated.

11. The equipment, number of men employed, and the expenses of the stable and delivery sections during the fiscal year 1910 are given in Table 7.

12. Omitting the wages paid the drivers and messengers, the stable section alone cost $18,447.37, making the cost per horse per year $802.06, or $2.20 per day, of which 37¾ cents was for feed.

13. From Table 7 can readily be obtained the operating cost of one 2-horse, 5,000-pound capacity wagon, and these are given in Table 8.

14. During the month of November, 1911, there were purchased and put into service two 1,000-pound trucks, two 2,000-pound trucks, and two 5,000-pound trucks, all of the electric type, and at the same time 17 horses and their equipment were sold, leaving six horses, one 5-ton capacity, two-horse truck, one single-horse truck, one carriage driven by two horses, and one carriage driven by one horse.

TABLE 13. COSTS OF ELECTRIC TRUCKS AND 2-HORSE WAGON.

	2-horse wagon, 5,000 lb. capacity	5,000-lb. electric truck	2,000-lb. electric truck	1,000-lb. electric truck
Average trips per day	4	8	8	9
Mileage per day, average	12	24	20	20
Mileage per month (loaded half-way	312	624	520	520
Average load per trip, lb.	4,000	5,500	2,500	900
Total load per day, lb.	16,000	44,000	20,000	8,100
Tons	8	22	10	4.05
Total load per month, tons of 2,000 lb.	208	572	260	105.3
Total cost per month	$280.74	$211.11	$187.81	$180.93
Cost per mile	0.899	0.338	0.361	0.347
Cost per mile (omitting driver's and helper's wages)	0.499	0.138	0.121	0.107

15. In November, 1912, one additional 5,000-pound truck and an electric-driven carriage were installed, and two carriage horses and one truck horse and their equipment were sold.

16. In January, 1913, one 8,000-pound capacity truck was installed, and two more truck horses and their equipment were sold.

17. The truck equipment, and the number and class of men employed for caring for the electric vehicles and the remaining horses during the year 1912 is given in Table 9.

18. During the coming year, and after the remaining six horses are sold the four stablemen will be dispensed with and in their place there will be employed probably two helpers and one laborer at a total cost of $6.80 per day, or $2,128.40, thus indicating a further reduction of $1,377.20.

19. All of the electric trucks were purchased from the Baker Motor Vehicle Company, of Cleveland, Ohio, and the iron-clad Exide storage batteries from the Electric Storage Battery Company of Philadelphia, Pa.

GOVERNMENT PRINTING OFFICE

ELECTRICAL SECTION

DAILY METER RECORD—ELECTRIC VEHICLE

Machine No. .... *Battery No.* .... *Date*..................*191*...

	READING OF ODOMETER	READING OF AMP. HR. METER	TIME	REMARKS
IN	....	....	....	....
OUT	....	....	....	....
DIFFERENCE	....	....	....	....

(Signed)..

20. It will be noted that there have been no tire costs during the year. This, of course, was due to the fact that none of the tires have worn out, but it should be stated that the tires on the 5,000-pound trucks are practically worn out and, in fact, were being replaced during the month of January, 1913, so that the tires on these trucks wore out after running since December, 1911, or a period of 13 months. The tires on the 1,000- and 2,000-pound trucks are still in fairly good condition. The tires on the 5,000-pound trucks would undoubtedly have lasted longer than they did were it not for the fact that these trucks were often loaded up to 7,000 pounds, making a considerably harder service than could have been anticipated by the makers.

21. The total cost of operating the combined delivery, stable, and garage during the year 1912 was as given in Table 10.

22. In Table 10 it is interesting to note that the six electric trucks, doing practically all of the work, cost only about twice as much as the six horses. As a matter of fact the six electric trucks alone did as much work as the total stable force did during the year previous, and the horse-drawn equipment simply took care of the increased work.

23. Table 11 shows in detail the cost of taking care of the electric trucks, and as the cost of the trucks of any given size is about the same, only one of each size is given.

24. From the given figures we can readily ascertain the cost of operating one 5,000-pound capacity electric truck as compared with one 5,000-pound capacity, 2-horse wagon.

The cost of two 2-horse wagons being $6,737.72 (Table 7), the saving due to the use of the electric truck is $4,204.39.

GOVERNMENT PRINTING OFFICE

ELECTRICAL SECTION

DAILY CHARGING RECORD—ELECTRIC VEHICLES

Battery No. .... *Date*................191...

TIME	VOLTS	AMP.	SP. GR.	TEMP.
....	....	....	....	....
....	....	....	....	....
....	....	....	....	....

(*Signed*)....................................

25. Unfortunately no mileage record of the horse-drawn vehicles was kept during the previous years, but the records show that the two-horse wagon made an average of four trips per day, and the present records show that the 5,000-pound electric trucks make an average of eight trips per day. The mileage of the electric trucks being about 24 per day, it may be assumed that the mileage of the horse-drawn trucks was about 12 per day.

26. For the sake of comparison the costs of the three sizes of electric trucks and of the two-horse wagon are given in Table 13. The average load on the 5,000-pound electric truck is 5,500 pounds, that on the 2,000-pound truck is 2,500 pounds, that on the 1,000-pound truck is 900 pounds, and that on the two-horse wagon was 4,000 pounds.

27. The methods of keeping the records are given as a matter of interest. The Daily Meter Record and the Daily Charging Record are made out, one for each truck, by the employes in the garage. These are turned in to the office each morning and transferred to the Electric Vehicle Record each month. This card is printed on both sides, thus providing space for a whole year.

GOVERNMENT PRINTING OFFICE

OFFICE SUPT. OF BUILDINGS

ELECTRICAL VEHICLE RECORD

Machine No. ....

MONTH	JAN.	FEB.	MAR.	APR.	MAY	JUNE
TOTAL MILES	....	....	....	....	....	....
AMP. HRS. USED......	....	....	....	....	....	....
AMP. HRS. PER MILE..	....	....	....	....	....	....
K.W. HRS. SUPPLIED...	....	....	....	....	....	....
COST OF CURRENT.....	....	....	....	....	....	....
BATTERY UPKEEP	....	....	....	....	....	....
TIRE UPKEEP	....	....	....	....	....	....
ELECTRICAL UPKEEP...	....	....	....	....	....	....
MECHANICAL UPKEEP..	....	....	....	....	....	....
INSPECTION	....	....	....	....	....	....
TOTALS	....	....	....	....	....	....

REMARKS...

....

....

28. The electrical and mechanical upkeep are obtained from the regular mechanics' works slips. Every machine in the office is given a number, and all repairs made and materials used are entered on the work slip and charged against the machine number and tabulated in the office. In this way an accurate record is kept as to the cost of each machine.

29. Under inspection is charged for the time for charging batteries, washing the trucks and similar miscellaneous work in the garage, and all of this cost is evenly distributed among all of the trucks in service.

Electric Coach Club asks Omnibus Privilege

An order for one thousand electric omnibuses will probably be given by the Electric Coach Company, 30 Church street, New York, if the company is granted the right to operate omnibus lines in New York at a five-cent fare. The company, which was organized recently by George W. Loft, H. L. Joyce, George Mackay, Charles Berg, Harry B. James, president of the Brooklyn & Manhattan Ferry Company, has arranged to apply to the Board of Estimate of New York City and to the Public Service Commission of the First New York District for permission to operate such lines. Under a recent act of the legislature, it is within the power of the Board of Estimate to grant franchises for limited terms for stage lines and to lay out routes for these lines.

Electrics Replace Horse in Indianapolis

Six light electric delivery wagons and one one-ton truck were placed in service, just before the holidays, by a large department store at Indianapolis, Ind. The drivers were those who had formerly driven the horse-drawn delivery wagons. The electrically run vehicles replaced twelve one-horse wagons and two double teams and as much as sixty-seven miles a day was made by the delivery wagons during the severe winter weather. The average number of packages delivered each day was 241 and the maximum number, 462.

Operating expense, charging, washing, garaging and replacement of parts	$2.00
Fixed charges, including depreciation and interest.........	1.30
Driver's wages	2.50
Total daily cost per vehicle..........................	$5.80

Satisfaction in Electric Truck Service

The electric motor truck is fast winning the favor of companies which do a large hauling business, department stores and coal companies for instance. The American Express Company is perhaps one of the largest concerns to do away with its horse-drawn wagons and use instead, electric automobiles.

It was in April that an auction of the company's wagons took place at the company's barns. Thirty wagons of various kinds were lined up for disposal and went to their new owners, in most cases, at less then ten per cent of their present value. The automobile trucks had been in use for a considerable time before final disposition was made of the wagons. The auction of the wagons was an unwritten testimonial of the company's satisfaction with the new method of delivery. The fact that there are now in service and on order for Chicago firms almost three times the number of electric wagons that there were one year ago, is proof sufficient that the electric truck makes for reliability and accuracy of service.

Some Recent Electric Truck Applications

The Small Buyer Often Studies the Situation More Carefully than the Large

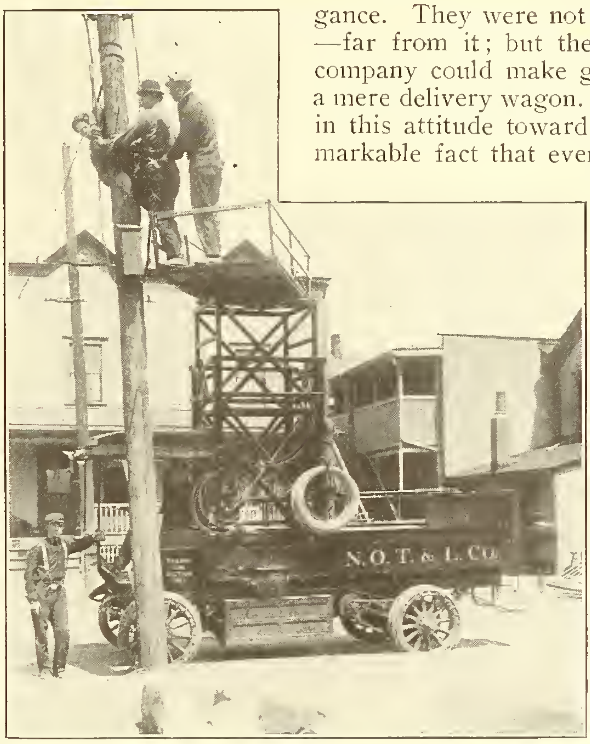
BY FRED W. HARRINGTON

THE Improved Cloth Sponging Company was a little, one-man concern that did pressing for some of the textile mills in Cleveland, Ohio. But if small, the company was wide awake and enterprising. It wanted to grow. Many methods are prescribed whereby a small business can be made larger, and no doubt the Improved Cloth Sponging Company considered and studied all of them. It might, for example, have increased its advertising; or it might have augmented its sales force, if such a term may be used in speaking of a one-man business. Then, when more trade came, the company could enlarge its facilities for work and delivery to meet it.

But the little company was wise, as a little company must be to become a big company. It saw, shrewdly enough, that there was one way at least to increase its delivery, sales and advertising facilities at one operation. The immediate purchase of a motor truck was the decision reached after much cogitation.

Having little definite knowledge of motor trucks, the situation called for investigation; and the result of the investigation pointed unerringly at the electric in preference to the gasoline car. The first thought that decided the question was that the electric's freedom from oil, grease and odors of gasoline, and its general cleanliness, would make it less liable to damage the goods.

But the friends of the Improved Cloth Sponging Company protested vigorously against this apparent extravagance. They were not prejudiced against electric trucks—far from it; but they could not see how so small a company could make good on so big an investment for a mere delivery wagon. That there was nothing of malice in this attitude toward the electric is proven by the remarkable fact that even the Baker Motor Vehicle Company of the same city, when appealed to, advised against the purchase until a larger business had been developed.


An Industrious Northern Ohio Traction Truck—Baker Electric.

But the Improved Cloth Sponging Company had some of that quality which is called obstinacy in mediocre people and persistence in successful people. Having received and filed—or thrown into the waste basket—all this adverse opinion, the company deliberately went out and bought a Baker electric truck of one-ton capacity.

And here is the proof, and the moral of this short tale: Inside of a few months the Improved Cloth Sponging Company had more than doubled its business. At the end of nine months, which was the last report, the truck had not cost one cent for maintenance or repairs, and the current to operate it at the rate of 60 to 65 miles per day regularly did not exceed $5.50 per month. Meanwhile, the business keeps on growing, for the company can give *service,* which is perhaps the most important of all considerations. And the truck is advertising the efficiency and enterprise of the company everywhere it goes.

Another record of a one-ton electric truck that in nine months has never cost anything is that of the Thom-

One of Haas Brothers' Two-Ton Baker Trucks.

A Baker Truck in Government Service.

son-Diggs Company of San Diego, Cal. This company is in the retail hardware business, and the truck, which is a Baker, is called upon to do from 50 to 60 miles a day in delivery work. There is one item of $2.00 for a broken battery jar; but, of course, that is not the fault of the truck.

In the wholesale commission and food business in Cleveland are the Haas Brothers. In their work they used three wagons and six horses; but, being enterprising and aggressive, they decided to purchase four motor trucks to replace this outfit and take care of the additional business which they had been anticipating. But they wanted gasoline trucks. Electrics would never do, they told the salesmen, because they could not climb hills or make the speed and mileage required in their business. The electric was all right, they thought, for a few blocks of good, level road, at, say, six miles an hour; but for real hard work—no, never. The gasoline truck was the only thing, they felt certain, that could take a steep hill, on a rough road, at racing speed, and keep it up as long as the driver stuck to his wheel. And that is what they thought they wanted.

This position seemed rather arbitrary; but Haas Brothers were not unreasonable about it, by any means. When they were asked if they would consent to look at an electric climbing a hill and doing the various other things that are supposed to be required of an auto truck, they were willing and interested. It was quite a simple matter to convince them that there was nothing they wanted done that an electric couldn't do better than they had ever seen it done. So Haas Brothers definitely discarded the gasoline idea, fixed as that idea had been, and installed a two-ton Baker electric.

This one truck ran along for six monhs, making from 45 to 50 miles a day, and meeting successfully all the conditions of service imposed on it. So pleased with its performance were the Haas Brothers, indeed, that at the end of the six-month period they bought a second truck of the same kind. It has now been ten months since the first installation, and the satisfaction of the commission firm has been perfect and continuous. With the two trucks the brothers have increased their business, by reason of excellent service, beyond those early anticipations that contemplated a necessity for *four* trucks. Yet the two electrics are handling the business so efficiently that they probably will not need any more for some time to come.

One very interesting point about the Haas Brothers' installation is that the men who drive the trucks are the men who formerly drove the horses. The driver who stepped from a wagon to the first truck had never been on a motor truck of any kind before. Inside of half an hour he was a fairly competent driver, and after the first half day he could handle his electric as well as an old hand. The electric, in other words, solves the driver problem.

These are only examples, of course, of what is going on every day. They are interesting, as all specific examples are interesting. They are more valuable indications of modern tendency than are the big electric truck fleets of our mammoth industrial and mercantile enterprises, because the small business is less flexible than the large, and its requirements are harder to meet. The big company can put in electrics for its city and short-haul business and gas trucks for long-haul work. It is the man who can only buy one or two trucks, and who must of necessity study painfully and cautiously every point of advantage and disadvantage before taking the (to him) big step, who helps show the world the superiority of the electric.

Amicable End to Rectifier Patent Suits

The exchange of licenses, permitting three companies to operate freely and separately under each other's patents was the result of the several years patent litigation which put matters in a seemingly hopeless tangle for the Westinghouse Electric and Manufacturing Company, and the Hewitt Electric Company on one side and the General Electric Company of Schenectady, N. Y., on the other. The majority of the patents under dispute were owned by the Cooper Hewitt Company while a smaller number was owned by the General Electric Company. The litigation just brought to an end was inaugurated soon after April 19, 1910, under which date two patents, Nos. 955,459 and 959,460, covering a mercury arc vapor lamp, were issued to Cooper Hewitt, who forthwith formed the Cooper Hewitt Electric Company for its exploitation. Subsequently, Hewitt discovered the applicability of the apparatus, which represented an absolutely new discovery in the art, to the rectification of alternating current and its value for such purposes in displacing heavy and cumbersome rotary converters and other apparatus. His own company, however, was concerned chiefly with the illuminating possibilities of the device. Hence, the Cooper Hewitt Electric Company constituted the Westinghouse Electric and Manufacturing Company sole licensee under these and other patents subsequently issued, to manufacture mercury vapor arc rectifiers for battery charging, etc.

The General Electric Company had busily worked along similar lines, meanwhile, and placed an almost identical apparatus on the market. Suits were instituted immediately by the Hewitt Company. The decision in the litigation which followed went to the Hewitt faction, but counter suits were entered in the meantime by the General Company, charging the Hewitt Company with infringements on the General's patents.

That was only the beginning of the entering of suit after suit, the last being made but six months ago by the Hewitt Company under patent No. 1,030,262.

Under the terms of the agreement just reached, the General Electric Company is licensed under the numerous Hewitt patents, of which Nos. 955,459 and 959,460 are considered to be basic, to manufacture both mercury arc rectifiers and illuminating lamps, while the Hewitt Company and the Westinghouse companies, in turn, are licensed by the General Company under its own patents to make use of the patented improvements previously charged to be infringed.

Manila Reorders Motor Trucks

Officials of the General Motors Truck Company were much gratified at receiving a repeating order for six two-ton G. M. C. electrics for shipment to the Manila Railway & Light Company, Philippine Islands.

The first shipment of ten went forward about six months ago, and their satisfactory behavior in the tropics is said to be the reason for the reorder.

Both purchases were made by J. B. White & Company, one of the largest electric railway contracting and operating companies in the world. Some of these electric trucks will be used in the service of the public utility company that furnishes light and transportation to Manila.

Significance of Electric Truck Reorders

Address at the Annual Meeting of the Chicago Section E. V. A. of A.

BY E. E. WITHERBY

THE electric truck is as yet rather in the minority when it comes to production; but statistics of production do not tell quite all the story. If you have ever noticed it, the big fleets of the country are electrics, and the majority of all motor installations are electrics. Those who have given up all horses seem to favor the battery-driven vehicle. I wonder why?

The bicycle had its cycle of popularity, and was succeeded by the automobile. Touring became the rage, and high speed cars were regarded as essential. The rapid growth of the gasoline pleasure car industry dwarfed the electric vehicle, both pleasure and commercial. The poor old electric truck was left behind to ponder, as it were, on the number and variety of its shortcomings. But this did it good—gave its sponsors leisure to develop a real road transportation machine—a strictly business vehicle, conforming to economic law, and so slowly but surely demonstrating its efficiency over that time-honored industrial unit, the horse.

Today the automobile industry is shaking down to the survival of the fittest. The market that appeared to have no horizon has developed one. Result: The next cycle—the commercial vehicle. The once despised motor truck, auto truck, power wagon, commercial car, or whatever they choose to call it, is now considered worthy of development by almost all of the manufacturers, whose one time chief worry was how to fill sixty per cent of advance orders.

While the scores of automobile makers were deploring the fact that there were only twenty-four production hours in a day, and only one receiving teller at many of the banks, a handful of electric truck makers were patiently plugging along, taking the chaff of the 90 h. p. expert and the chilly greeting of the note broker. The idea of them thinking they were in the automobile business!

They had to sell what 99 out of 100 did not want, and when not busy dogging the sheriff, they watched the multitude scramble for the latest hair trigger "six." Nobody loved them—nobody cared whether their product lived or died. They were not even considered "also rans."

And then the pendulum began slowly to swing back.

You all know how it is today; how we already have our 300 makers of motor trucks, about ten per cent of which produce electrics. And the electric truck might continue to be hopelessly out-numbered, but for this little 1,000 horse power fact: A touring car and a motor truck are not quite the same, be they gas or electric.

"The electric is the only truck with a past!" What that past means to you and me, in fact to the whole commercial industry, it is not yet fully realized. It seems for one thing that the long, lean years of development are over, at least for the pioneer builders. It means also that regardless of the pleasure car experience behind them, most of the non-electric trucks have still their history to make. Money will buy almost any kind of knowledge, but Experience has a way of tacking on her little commission first.

So let us see just what electric truck reorders signify.

No one can get behind the fact that much of the confidence in electric commercial vehicles is due to their long life. There are Waverlys and Lansdens and Studebakers and G. V.'s, and I do not know how many others, eight and ten or more year's old, still in service. One can say to a prospective buyer: "Here's one of our old timers with a fine nine year's record, and here is what we are building today. Notice how much lighter it is. The parts are interchangeable"—and so forth and so on. If there was only the 1913 product to show him, it would still be, in his mind, the unproved inventor's model. It's the old stuff that shows the evolution and proves the case.

So reorders signify satisfactory performance and past performance influences reorders. But past performance deals with more than the machine alone. Trucking with motors contemplates much more than the right speed and mileage and the few times the truck was towed in. It contemplates improved methods in loading and unloading; better routing, and systematizing new business developed by better service. It involves the question of type and capacity of machine, the best kind of tires, the adaptability of this or that capacity for certain work in various lines of business. There's no end to improvements in the operating end of motor trucking. And here is where the electric wins out—where past performance counts—where actual results outweigh theory every day in the week.

The man who bought one electric truck in 1906, and today operates ten of them, has learned much more than would appear on the surface. He no longer hungers for high speed, for, in 1909, say, he bought a 2-ton cross-country truck that would make up to 20 miles an hour, and sold it for junk 18 months later. He now

Acker, Merrall and Condit Company's Fleet of G. V. Trucks.

An Easy Load for a G. V. Truck.

knows how to get the most out of batteries and tires, and has worked out a little bonus system for his drivers, so that he doesn't get in trouble by working them overtime occasionally. He has improved his loading platform and devised better interior shipping methods. Next year he is going to buy 20 more electrics and sell all his remaining horses. He is going to pull down the old stable and save buying $50,000 worth of land for that new wing. His wagon yard space will hold his electric garage and a new ice plant or warehouse. In other words, he is cashing in on what the electric truck has taught him about scientific road transportation.

So when the manufacturer sees a big reorder come in for electric trucks, he may shake hands with himself, whether his office gets the business or that of some other fellow. It means that another firm has decided to do business the electric truck way; has become convinced of the superiority of the electric truck principle. It means that as soon as the investment is arranged for, every bit of work that an electric can do better than horses for this firm will be done with electrics. Steam trucks or gas trucks may be tried out, but if the work is in the field of the electric, economic law will eventually select the right truck. Never lose sight of the fact that while competition may be fierce and thousands of other trucks are now bought for the work that the electric can do more cheaply, the electric has economic law behind it and will dominate as surely as a great primal force like electricity will push aside and supplant animal power or another substitute for it. I am not ignoring the gasoline truck for work in its field, but dealing with the electric in its proper sphere.

The manufacturer may say he can't afford to wait forever for the electric to come into its own; but I don't think he means that, for I notice they all get a contract about every so often. Cheer up! Have faith in the proposition! It isn't the case of the hare and the tortoise, for the field of the electric is now recognized, and nothing short of a panic can prevent an immediate increase in electric truck sales. Efficiency engineers are already recommending the electric for certain classes of trucking, and they will do it more freely as they know more of the electric as an engineering proposition.

The cumulative success of the electric is already proportionately greater than that of its competitors, because it is seldom put to work which it can't make good on even if it had no inherent advantages.

Just select the right truck for the work involved and there is little danger of it being traded in for something else. That was not so five years ago, but it is today because no wise business man is going to forsake certain economies for uncertain advantages. He knows that his year-old electric has accomplished certain things, that it accomplished certain things for his friend in another city and did so for eight years. The burden of proof is up to the fellow who promises to do better work at less cost, and over a period of years he can not do it. If he is wise, he will sell machines to compete with the slow freight train, for intercity runs, for the delivery of perishable goods and similar work where the saving will warrant the higher cost of greater speed and unlimited mileage.

I want you to ponder the enviable performance records of the electric, but I would have you see also the other reasons behind electric truck reorders. The latter means, too, that big brewers, department stores, express companies, and so on are really standardizing on the electric as a delivery unit. They may buy other machines, but many of them only until they can establish distributing depots, and by further improving their operating methods, utilize the electric exclusively. Electric truck makers have heretofore been devoting most of their time to perfecting their product; to adjusting design battery, tire and controller problems. In a short time they will be in a position to give greater attention to more miles per charge, and, where needed, a higher speed. The electric truck has been able to expand only so fast as limitations imposed by outside conditions were removed. What amuses me now is that about the time the makers get ready to give the speed and mileage that operatives have been crying for, they will have learned enough about operating costs to convince them that they don't need the increase over present standards. They will say: "Yes, we used to think we needed 60 miles a day, but we find if we route the goods right, about 40 miles is all we require, and we're not going to pay for what we don't need."

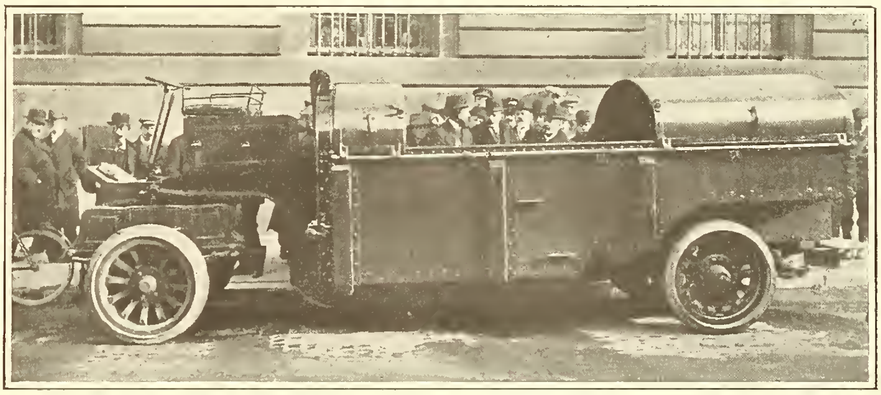
Just study the trend of the times in pleasure car practice, and you will find that as the economist now predominates among automobile users, smaller motors developing less horse power are in demand. Lighter cars which cut down tire and gasoline bills have the call. There will be big, high powered cars built still, but the economist is already the biggest factor in the field. There are twenty hard-headed, experience-wise economists to one of the other class. You can't bury economic law, and as soon as business men see how inefficient and wasteful were all the methods connected with the animal haulage, they will go over this situation and apply business principles in solving it. They are doing it now, a small percentage of them, and once the right principle is understood, they will buy trucks as they do other machinery. Then manufacturers will worry about filling orders; not about landing them.

Electric truck reorders mean the recognition of the electric as supreme in its field. They imply the adoption of the electric truck principle in the horseless transportation of raw material and the delivery of finished goods. Electricity dominates the age we live in, and that means it will be called upon to help solve more and more of our industrial problems. Every time I hear long winded arguments about the superiority of thick or thin plates, square axles or round axles and what not, I feel like asking the debaters to keep in mind essentials and work for the electric truck; not for the "bug" on engineering frills. A man can have his truck painted any color he wants it for all I care; he can have a straight steering wheel or one tilted; a brass horn or a silver gong, so long as he buys a standard truck.

So let us concentrate on the main point, viz: That every good electric truck rightly sold for work it can do best, helps the whole cause. There is no lane without a turning, and no number of obstacles that can keep down the best machine forever! When we get into scientific motor road transportation, it's eventually a question of dollars and cents. I'd rather go down to a hundred defeats, even with the odds against me, than be a "quitter." I'd rather have the satisfaction of selling one machine a month to customers who will buy more because the truck did what I promised they would do, than sell forty a month and have to cross the street when some of my misled victims turned the corner.

Paris Hermetic Street Cleaning Electric Truck

The street cleaning department of Paris has been thoroughly "automobilized." Motor sprinklers flush the streets, motor sweepers brush the dirt to one side, and motor refuse wagons cart away the garbage of the householder and the sweepings of the streets. Only a few months ago a special commission, appointed by the city of Paris, made a thorough test of a new type of motor refuse truck in front of the Hotel de Ville. The commission laid great stress upon the fact that the transportation of refuse material must not be accompanied with dust. Consequently, the vehicle had to be completely inclosed. The last truck tested by the commission is illustrated in the accompanying engraving. It is an electrical vehicle of great carrying capacity. The principal feature is the hermetic closure of the body. The covers are movable on rails.



Hermetically Sealed Electric Truck Used in Street Cleaning Work in Paris, France.

Chicago Women Lead as Car Owners

Apropos the apparent breaking down of the barrier of custom and increasing of the number of women who are driving their own cars—both electric and gasoline—are some statements recently made by H. P. Dodge. His statements set forth a not often thought of angle of view as to why auto driving by women is becoming more prevalent.

"Engineering skill is today bending its energies—not without marked results—toward building cars with mechanical operating equipment for steering, control and braking that requires as little mechanical understanding and as little effort on the part of the driver as is consistent with the best results.

"Notable strides are being made in this respect in the electric car field and with the introduction of these improvements has come the ever-widening circle of women drivers.

"This is naturally so, when you stop to consider that today all that is necessary to drive a car forward or backward is simply the turning of a small disc with the thumb and finger, or pushing a little lever or moving the foot—that a brake may be applied by pressing a button, or light pressure of the foot—that the machine may be steered by an easily hand-moved lever.

"Women of the East are notoriously behind those of the West in electric car driving. New York does not buy nearly as many electrics as Chicago. This condition seems to be due entirely to custom. During the last six months, however, this condition has been undergoing a rapid change—and today our company is receiving three times as many orders from eastern cities as a year ago."

Wants Electric Home on Wheels

A Long Island woman recently sent to the Electric Vehicle Association of America the following request:

> Could you build an electric car, on the small van design, and equip same with living accommodations for three adults; have the electric motor power to be used on electric cooking appliances—say, for instance, making use of my own ideas, of pâpier-maché washbasin and drain pipes, the same to be thrown away each day; collapsible rubber bathtub, fastened in a compartment under a trap door in floor of car; walls lined with quilted satin sectional flaps, hiding compartments and shelves for clothing; also cot beds to be folded back against the wall—same for tables and campstools; mirror panels, electric light and flat wicker hamper on roof of car—same surrounded with guard railings; extension porch folding under exit door; chauffeur's seat convertible into a cot on the Davenport bed plan? What would be total cost of such a car? Walls to be satin—floor stained cork mat—or inlaid rubber flooring like that used on the new ferry boats; long narrow windows swinging outward and shutter ventilators high above and in the roof; all fixtures aluminum rims—storage space for sliding table and aluminum cooking ware somewhere near the motor. Could same be built and sold on terms of a few hundred down and balance at stated intervals, or same as a house mortgage, at 5½ per cent interest? The writer abhors the stationary home idea, and wants a home on wheels for self, husband and son. Can draw the design, and have had it in mind for over ten years. Now please help me out with advice. Got no money to waste and want substantial returns for what I would spend. Don't like gasoline. Your esteemed reply would greatly oblige.

The Borland electric has long been considered a standard car in the world of electrics and its performances at times are remarkable. The latest feat, going from Chicago to Milwaukee on a single charge, has prompted the company to issue an attractive booklet describing in detail the performance of the car.

Pleasure Car Specifications for 1913

Some Features of This Year's Line of Electric Automobiles

A GREAT improvement in the body lines and interior arrangements of the electric vehicle has been made during the past year. The old style that was suggestive of a "carriage without a horse," has entirely disappeared, the new types being as distinctive as that of the modern gasoline car. These bodies with their low, rakish hang give an impression of power and speed that was entirely lacking in the top-heavy and spidery models of the past. The more spacious bodies introduced this year have been responsible for improvements in the seating arrangements, nearly all of the makers having some variation of the "all face front" idea.

Considerable attention has been paid to the arrangement of the controls, making the operation and control of the car simpler than ever. Interlocking devices connecting the different parts of the control system makes it impossible for the operator to make a false move that would endanger the car or its occupants. There have been no radical departures in the design of the mechanical or electrical equipment, all the improvements in these details being simply refinements that have added to the efficiency and mileage. Advantage has been taken of the silent chain drive in either the intermediate or final drive. While the use of a two speed transmission has been advocated by several of the manufacturers, its use has not been general enough to include it in this summary of the year's models.

The following specifications, which were compiled from data furnished by the builders, cover the principal features of the 1913 electrics. In each case we have endeavored to give a complete description of the mechanical and electrical features as far as it was possible with the material at hand. More extended data on the different makes will appear from time to time in the succeeding numbers of ELECTRIC VEHICLES.

THE ARGO.

Three models of the Argo electrics are offered by the Metzger-Herrington-Argo Company of Chicago, which is the sole sales agent of this car. All of the models are of the "Renault" type, having a long, gracefully sloping hood in the front of the car that greatly suggests the gas car by that name. The low hung bodies with their comfortably located doors and running board mark a great advance. They are designed so that there is plenty of knee room between the front chair and the rear seat and so that a clear view may be had by all of the passengers no matter what position they may occupy in the car. Following prices apply to Argo electrics F. O. B. factory at Saginaw, Michigan: Brougham "A" (four passenger), $2,800. Brougham "C" (five passenger model), $3,100. Model "B" roadster (four passenger), $2,500.

Westinghouse four-pole motor, series wound, railway type, geared to rear axle through herringbone gears without universal joints or slip couplings. Special casing connects motor and rear axle casing into unit power plant, supported by frame at motor end, thus eliminating strains on motor. Tubular connection between motor and axle, which acts both as torsion and radius rod, carries all driving and braking stresses directly to chassis frame. Ball and socket arrangement at front end allows axle to adapt itself to road conditions without cramping power unit. Imported annular ball bearings used throughout power plant. Controller giving five forward and reverse speeds supplied on all models, speed range 4 to 25 miles per hour. Interlocking foot control operated with right foot pedal so one movement throws off power and applies brakes. Wheel steer universally used, irreversible type. Ball bearings on the knuckles of front axle make steering easy. Rear axle full floating type equipped throughout with Hess-Bright ball bearings. Forty cells of 11 plate "Hycap" Exide batteries, standard equipment, on all models, option of Iron Clad Exide cells, for additional cost. Sangamo ampere-hour meter on dash records current passing through cells on charge and discharge. In all cases battery placed under hood at front of car.

Argo Model "A," four passenger brougham, has wheel base 108½ inches, weighs about 3,400 pounds completely equipped, carrying weight well between axles. Aluminum body having depth of 75 inches and rear seat width of 46 inches upholstered in Bedford cloth with broad lace trimmings Five-inch channel frame supported in front by 38-inch semi-elliptic springs and at the rear by 38-inch full elliptic scroll. All windows drop except front, clear vision type adjustable for all weather conditions.

Four passenger roadster, Model "B," open torpedo type machine, wheel base 108½ inches. Except for body, specifications practically same as for the brougham just described. In both cases Renault type hood used for covering batteries in front of car. Full mohair cape top, side curtains and wind shield provided. Full equipment of head, tail and dash lamps supplied as in other models, finish black enamel with silver trimmings. Motz High Efficiency cushion tires standard equipment, 38x4 inches. Pneumatic tires 36x4 optional.

Model "C," five passenger, fore drive brougham, with exception of body and interior equipment practically same construction as roadster and coupe. Driver is provided with stationary chair; 20 inches knee room between chair and dash. Opposite to driver seat is swivel chair. All windows drop except front, which has pivoted upper section adjustable for all weather conditions. Weight complete about 3,500 pounds.

THE BAILEY.

Bailey electric cars, built by S. R. Bailey & Company, Boston, Mass., are especially designed for use with the Edison battery. In addition to this feature they have several other uncommon and ingenious characteristics, such as the suspension of the body and the stream line form of the dash or wind shield. Three models are made, two roadsters and a Victoria Phaeton, selling respectively for $2,500 and $2,600 with the standard Edison equipment (52 A-6 cells), With 60 A-4 cells, the roadster sells for $2,250. Easy riding qualities are due principally to low center of gravity and method of suspension. While road clearance is 12 inches, centers of gravity is less than 18 inches from road.

Front end of car is hung above and in middle of long cross spring which extends nearly entire length of axle. At point of support is ball and socket joint well above center of gravity. Tendency of this arrangement is to make body lean inward instead of outward in turning corner. Position of front spring brings weight near ends of axle and stops side sway in front of car. Ball and socket joint by which car is suspended allows axle to rise or lower slightly when passing over an obstruction without seriously tilting body. Rear of body is hung from two points on two full elliptic springs that run lengthwise of body. This gives practically three point suspension for chassis. Frame of Bailey electric is wood, bracing only being steel. Frame forms both body and battery box and is very light. By lifting hinged metal hoods, motor, controller, all driving mechanism and battery are open to easy inspection. Curved upper surface of hood directs air stream due to motion of car over heads of passengers. Wheel steer is provided with controller lever mounted on top of wheel. Control lever may be easily moved in desired direction by finger tips. Six forward and three reverse speeds, all attained by lever without use of pedals. Two brakes, one set on wheel hubs and other on counter shaft. Both sets operated by foot pedals. Motor, General Electric type, suspended under rear hood, and drives jack-shaft through Morse silent chain. From jack-shaft power is transmitted to rear wheels by double chain drive. Alloy steel chains pass over large diameter sprockets and form quiet and efficient means of driving, arranged so adjustments are easily made. Standard maximum speed 25 miles per hour with roadster and 20 miles per hour with phaeton. These figures may be increased, which, of course, reduces mileage. Cars with standard maximum speed will average 60 to 80 miles per charge with 60 A-4 cells, and 75 to 100 miles with 52 A-6, phaeton running at 15 miles and roadster at 20. Pneumatic tires 33x4 inches standard equipment on roadster; Motz tires on special order; 34x3½-inch tires on phaeton. Wheel base is 106 inches.

Victoria phaeton is graceful and pleasing design. Batteries carried underneath body in center of chassis. Low position of batteries gives car stability and increases ease of riding. Wheel steer. Seat wide enough for three ordinary persons. Large open space underneath for carrying luggage. Access to batteries by simply raising floor boards. Raising front hood exposes controller and wiring, and motor is reached by raising similar hood in rear. Special storm shield fits in space in front of seat for winter driving. Body of laminated wood. Wheel base of phaeton, 82 inches.

THE BROC

Five models are built by the Broc Electric Vehicle Company, Cleveland, Ohio, known as Models 20, 21, 28, 29, and 31, the first two types differing only in the construction of the tops. Roughly speaking the product of the Broc Electric Vehicle Company is divided into two principal types, the stanhopes and the broughams, there being two of the former models (20-21), and three of the latter. Each of the broughams has accommodations for five passengers. The Broc vehicles are low hung, the distance from the ground to the sill being 24 inches. This reduces the tendency to skid and makes it easy to enter the car. The slight increase in the height of the seats is of advantage in crowded thoroughfares as it allows the driver to see for a considerable distance in all directions. In this respect the Broc is a compromise between the high built coupe and the "skimming dish" roadster with its few inches of road clearance.

Four pole, series wound, 80 volt motor driven from 40 cell, 11 plate Exide battery. Motor drives rear axle directly through reduction gears, no chains being used. All cells located in front and rear of car, easily accessible by raising hoods. Load on the wheels equally balanced. Iron Clad Exide furnished when specified at increased price. Continuous torque, drum type controller gives five forward and five reverse speeds with one lever. Foot pedal prevents accidental reverse. Smooth, even change in speeds without jerking or waste of current. Practically impossible for this type controller to arc or "freeze" contact points. Controller operating lever moves in vertical plane at end of seat, and locks in neutral position by means of key. Impossible to start car accidentally when key is inserted. Key acts directly on safety plunger instead of on lever. Necessary for plunger to be lifted before handle of controller is moved. In emergency, car may be brought to standstill with controller on any speed by pressing down on plunger. In addition to motor speed regulation, controller acts on electromagnetic brake, so that brakes may be applied by moving controller slightly back of power-off position. By this arrangement control is concentrated in one lever. Emergency foot brake pedal acts on internal expanding brake mounted on hubs of rear wheels. This brake pedal is interlocked with control system so that current is broken at the instant that manual brakes are applied. As use of either brake opens main circuit automatically, power can only be applied again by starting back at first speed. Lever steer used with all cars except Model 31, where wheel or lever is optional. Steering levers are folding side type. Front axle usual I-beam section, dropped in center, equipped with ball-bearing knuckles. Semi-elliptic front, three-quarter elliptic rear springs. Arrangement of rear springs permits elimination of torque and radius rods, and reduces strains on rear axle system. Ball bearings used throughout. Beautiful and symmetrical bodies and luxury of interior fittings and upholstery are characteristic features. Curved French roof, tulip top joining body to roof, and rounded front windows. Location of seats makes it possible to give plenty of leg room without making body large and cumbersome. Double ventilators supplied with all models, and all windows may be dropped so that car may be practically open. Ventilation through front window by independent spring sash at top of window. Laminated wood is used in building tops. To prevent splitting, all mouldings worked out of solid wood, except those used in doors, corners and hood, in which case aluminum tees are used. Aluminum panels, backs and hoods. Wooden window sashes covered with cloth and equipped with rubber noise deadeners. Rear cushions all over 8 inches in depth, and cushion on rear seat sloped backward in easy position. All seats may face forward in closed models. Both front seats revolve in rear drive car "Model 29," and are arranged so that driver has clear view. In Model 28, front seats do not revolve, but are merely shelves, of comfortable width and cushioning, installed in two front corners.

THE BAKER

The three electric pleasure vehicles made by the Baker Motor Vehicle Company, Cleveland, Ohio, consists of a four passenger coupe selling at $2,850; a five passenger brougham at $3,200; and a two passenger Victoria at $2,000. In the Baker line, a different motor drive and chassis is provided with each model, the arrangement being quite different in the coupe and brougham types. In either case, however, the motor is carried at the center of the pressed steel chassis frame, where it is thoroughly protected from road shocks and vibration by the spring. The frame of the coupe is slightly tapered from the rear to the front while the frame of the brougham is given a considerable offset at a point just back of the front wheels in order to decrease the turning radius with the longer wheel base of the latter model.

Motor in coupe drives short jack shaft through silent chain, shaft and sprockets being fastened on back of motor by means of bearings. Gears and chain of first reduction covered with oil and dust-proof housing of substantial design. Propeller shaft connected to both differential pinion on axle and stub end of jack-shaft with universal joints drives rear axle. Motor series wound, four pole General Electric suspended at three points from frame. Continuous torque drum type controller, six forward and three reverse speeds, mounted on chassis frame directly under rear seat so controller lever passes down and directly to controller shaft. Extension from brake pedal control rod interlocks with controller so that applying brakes cuts off current. Resistance grids mounted on frame directly opposite to controller and in position where air currents dispose of heat. Brakes of internal expanding type mounted on rear wheels. Rear axle housing and motor of brougham are connected by long tubular housing that acts both as torque tube and radius rod, and also carries reduction gearing. Ball and socket joint at front end of motor forms flexible connection between motor and chassis frame, allowing motor to move to meet road conditions. Two tie rods connect ends of axle with inner end of motor so that torque tube acts as king post of a truss and reduces transverse bending moments on the motor. When wheel steer is used with this model, controller is operated through chain and sprocket system in which sprockets are concentric with shaft. Control lever mounted at top of steering wheel shaft acts on lower sprocket through spindle that passes through interior of steering post. Batteries are mounted under hoods at front and rear, making batteries and connections instantly accessible. Thirty-two cells Exide battery furnished with coupe, forty-two cells with brougham, and twenty-eight with Victoria. Maximum rated speed, 21 miles per hour. Mileage per charge, between 60 and 110 miles. Pneumatic tires, 32x4 inches, standard equipment, with both coupe and Victoria. Brougham equipped with 36x4-inch pneumatics. Cushion tires on special order. Wheel base of brougham 92 inches, coupe and Victoria 88 and 80 inches respectively. Long, specially tempered springs, half elliptics on front axles and full elliptics on rear models. Semi-floating type rear axle of substantial design carries differential gear of conventional type. With lighter models it is connected with motor through unversal joint shaft, in brougham connected with tubular torque rod that makes it a unit with motor frame, and therefore requires no universals. Front axle of brougham is steel forging, I-beam type. Tubular front axle in coupe and victoria. All bodies low and beautifully proportioned. Laminated wood top of French or curved type adds to appearance of car, and increases head room. In nearly all models running board is slightly below centerline of hub caps, making it easy to enter. Deep cushions on both front and rear seats, plenty of leg room between seats in both front and rear drive types. Front seats in "Va" coupe, rear drive type, arranged in corners of car at an angle. Revolving front seats with wheel steer, front drive model, type "VAF." These are similar to front seats of rear drive model in general construction, except they are free to turn in any direction. All windows may be lowered, front window equipped with separate glass wind-rain shield pivoted just above top of sash; ample ventilation without draft or entrance of rain. Full equipment of lamps, instruments, and toilet appointments.

THE BORLAND-GRANNIS.

The line of electric cars built by the Borland-Grannis Company, Chicago, consists of five models ranging from $2,500 to $6,500. In the construction of the Borland cars, the makers have used standard materials that have proved their worth by several years of practical service, which in many cases have been modified to meet their particular demands.

Ligget front axle, ball bearing knuckles making steering an easy task. Rear axle full floating type made by Weston Mott Company, in which axle is supported on F. & S. imported annular ball bearings. Differential gears cut from alloy steel by Brown-Lipe Company, noiseless in operation. Special series wound, 80 volt motor made by General Electric Company. High speed type, lighter and smaller than low speed motors, allows greater road clearance and less current in bringing car up to speed. Double reduction between motor and axle. Silent chain running from pinion on motor shaft to propeller shaft makes first reduction, remainder of motion being taken care of by bevel gear and pinion on differential. Motor mounted well up on chassis by specially designed three-point suspension frame, open to inspection and free from any danger of axle strain or obstructions in road. Motor located in middle of the chassis and suspended by springs, is free from vibration transmitted by driving wheels. Exide batteries exclusively, number of cells and plates per cell depending on type of vehicle. In rear drive coupes, batteries are split into two groups, 24 cells mounted in hood in front and 16 in rear. This arrangement affords proper balance when passengers are seated. Six speeds forward and three reverse by specially designed non-arcing General Electric controller, actuated by horizontal lever in all closed types of cars. In reversing car, lever is raised slightly and moved back until desired speed is attained, without use of separate pedals or buttons. When advancing speed there is no shock or jar between steps as circuit is not broken and torque is continuous. Interlocking device between controller and brakes so that current is automatically broken when brake is applied. In roadster model, accelerator pedal used in addition to regular control lever by which each of six forward speeds can be increased by six per cent without moving control, an advantage in crowded thoroughfares.

Model 50 coupe seats five passengers with plenty of knee space, and seats all occupants facing forward. Body is spacious and has beautiful low lines. Rear seat 50 inches wide and 22 inches deep. May be driven from either front or rear seat, having upholstered revolving front seat. On opposite side and in front is folding seat, Pullman chair, for driving seat in front drive models, padded swivel seat alongside. Wheel base 96 inches. Forty Exide cells. Pneumatic or cushion tires optional, standard pneumatics being 34x4 inches. Price fully equipped $2,900, f. o. b. Chicago.

Borland roadster, "Model 52." Equipped with 42 cells, 11 plate Exide battery, speed 35 miles per hour, and remarkable mileage capacity, due principally to light weight and small head resistance. Wheel steer. Mohair cape top, side door curtains and glass wind shield. Power plant similar in every respect to coupe model, except accelerator pedal for speeding up in close quarters. Price $2,500 with all equipment.

Seven passenger electric limousine, "Model 60," reflects great credit on its makers for beauty and originality of design. It resembles gas car in general outlines, and is fitted with every possible convenience. Wheel base 123 inches, speed 25 miles per hour, capacity 125 miles. Body designed and built by C. P. Kimball & Company, Chicago. All batteries carried in front under long sloping Renault type hood. Owing to long wheel base and arrangement of body this battery location gives proper balance when passengers are seated in tonneau. Price fully equipped $5,500.

Colonial coupe, "Model 45," has shorter wheel base, smaller motor, and several other modifications from regular coupe. Seats five passengers, revolving and collapsible seats, either front or rear level drive. Same grade of equipment as regular coupe; simply a smaller car. Price $2,500.

Five passenger brougham. Body is same size as Colonial coupe and appointments about the same, except that rear drive only in brougham.

THE BUFFALO

The Buffalo Electric Vehicle Company, Buffalo, N. Y., offers three models of the Buffalo electric; a two passenger roadster selling at $2,600, a coupe selling at $2,900, and a four passenger brougham at $3,000. The use of wire wheels is one of the most distinguishing external characteristics of this make of car, although the bodies have several original points such as curved glass front windows in the closed models, and a retreating Renault type hood on the roadster and coupe.

Rated maximum speed of roadster is 32 miles per hour; closed body, according to maker, cuts off approximately two miles per hour. Wheel base 100 inches. Series wound Diehl motor, supported at center of chassis by three-point suspension, 42 cells Philadelphia batteries 140 ampere hour capacity. Drum type controller on left of car, four forward speeds, one reverse. Battery divided between front and rear hoods, easily accessible by lifting hoods. Pneumatic tires, 34x4½ inches, standard equipment.

THE CENTURY

A five passenger brougham selling at $2,550 has been placed on the market by the Century Electric Car Company, Detroit, Mich. The chassis is of the underhung type similar to that of the American roadster and as a result, the floor is brought within a few inches of the road bed, much lower than is possible with any other form of construction. The maximum rated speed is 23 miles per hour with a capacity of from 60 to 100 miles.

Westinghouse series wound four pole motor, suspended by three-point spider in center of chassis frame. Thirty cell Exide battery under the front and rear hoods, 18 cells forward and 12 rear. Capacity 162 ampere hours, at 60 volts. Westinghouse drum type controller on left of machine, six speeds forward, three reverse. Full floating type rear axle shaft driven through universally jointed propeller shaft. Motz cushion tires, 36x4 inches, mounted on clincher rims both front and back. Wheel base and road clearance 98 and 12 inches respectively. Semi-elliptic springs in front, triple platform springs in rear.

THE CHICAGO

The four and five passenger limousines offered by the Chicago Electric Motor Car Company sell for $2,800 and $3,100, respectively. These cars present many original and praiseworthy features both from a mechanical and artistic standpoint, and reflect great credit on the designers and builders.

Westinghouse motor, slow speed series wound type, drives directly to rear axle through universal joint propeller shaft without intermediate reduction gearing. Forty cells 11MV Exide battery standard with both models. Iron Clad Exide or Edison cells furnished at additional cost. No batteries carried over rear axle. Five forward and reverse speeds by special Westinghouse continuous torque drum type controller, equipped with magnetic blow-out that prevents contacts from burning or freezing. No wasteful resistance speeds. Controller mounted near motor, minimum of wiring. Horizontal lever actuates controller drum, locked by Yale lock when not in use. Cut out interlocked with operating brake so applying brakes will open circuit. Emergency cut-out completes three methods available for stopping car. Channel section, pressed steel frame having 4 1/16-inch side members forms support for all mechanism. Rear axle Timken full floating type with one piece housing. With exception of F. & S. ball bearings on motor, all bearings Timken tapered roller type. Front axle I-beam section, heat treated, equipped with ball bearings at all knuckle joints. Large offset in frame just back of front wheels permits turn in 34-foot street with four passenger model and turn in 38 feet with five passenger. Bodies of both models well proportioned and spacious, rear cushions being 53 and 54 inches respectively. Driver occupies rear seat in small model, fourth passenger being accommodated on front seat arranged so he does not obstruct vision of driver. In larger front drive machine, three passengers carried on rear seat, two on front chairs, one of latter being driver's seat. Lever steer is used on both models. Large parcel space under seat of four passenger car. Driver's seat in five passenger, Pullman type, 20x20 inches. Fifth seat collapsible.

THE CHURCH-FIELD

The Church-Field Motor Company, Sibley, Mich., is the builder of a brougham and a roadster listing at $2,800 and $2,300, respectively. Both models have a Renault type hood under which the batteries are located, this feature giving the cars much the appearance of a gas machine. The rated speed of the brougham is 24 miles per hour, and that of the roadster is 30, the difference being due to the extra weight and head resistance of the enclosed body.

Wagner series wound motor suspended at center of chassis, 24 cells Philadelphia battery in brougham, 28 in roadster. Church-Field controller mounted at left of car, ten forward and ten reverse speeds through single lever. Full floating type rear axle, pedal controlled expanding and contracting brakes on rear wheels, interlock between controller and brake pedals. Wheel base of both models 100 inches.

THE COLUMBUS

Six models are included in the line of electric vehicles offered by the Columbus Buggy Company, Columbus, Ohio; a victoria stanhope, a roadster, coupe, colonial coupe, brougham, and a colonial brougham. These models range in price from $2,500 to $3,200.

General Electric series wound motor suspended in center of chassis on short subframe extending from main pressed steel members. Back geared jack-shaft that forms part of motor frame, drives propeller shaft through two universal joints. Contracting band brake mounted on end of jack-shaft, actuated electrically by controller lever. Shutting off motor applies brake automatically in one movement of controller lever. Double expanding and contracting drum brakes on rear wheels operated by two pedals. Controller, continuous torque drum type, six forward and reverse speeds, each point of contact non-arcing. Interlocking device, impossible for operator to reverse car without bringing controller lever to neutral position. Side lever steer in all models except roadster and colonial brougham. Exide Hycap cells, standard equipment, in two groups, one-half under hood in front, remainder under hood in rear. Number cells used depends upon weight of various models, 32 11 plate cells on victoria stanhope, 36 cells in roadster and coupe, 35 cells in colonial coupe, and 40 cells in brougham and colonial brougham. Pneumatic tires, 34x4 inches standard with all models except brougham and colonial brougham. In former, 34x4½-inch tires in rear, and in latter both front and rear wheels are 36x4 inches. Bodies are designed by company, and built by it in its own shop.

Victoria stanhope, "Model 1204," open type, four passengers, graceful design. Both front and rear seats stationary. Front seats in corners of car, semi-chair or independent type. Cape top and folding glass wind shield. Wheel base 86 inches.

Roadster model torpedo type, straight line body effect. Long front hood under which battery cells are carried. Ample room on low seat and comfortable position, because of slanting footboard. Mohair top, side curtains and regulation type of glass wind shield. Wheel steer. Wheel base 92 inches.

Two coupes, Models 1220 and 1230, four passenger cars of enclosed type, roomy and elegantly equipped. Both cars controlled from rear seat by side lever. Wheel base of coupe, 92 inches, colonial 86. Pivoted sash in front window opening swings forward. Batteries accessible under hoods at front and back. Hammered aluminum panels in all enclosed models. Choice of upholstering. All seats arranged so there is no strained position in clearing view of driver.

Brougham Model 1234 is lever steered from rear seat. Two forward seats are Pullman type, one stationary and the other revolving. Choice of upholstering. All passengers face forward in colonial brougham, driver in front, left hand seat. Wheel steer. Front seat at driver's right revolving type.

THE DETROIT

The Anderson Electric Car Company of Detroit, builder of Detroit electric cars, has designed and built all of the bodies and electric details of its cars even to the motors, controllers and batteries. Except for the bearings the company has not assembled any "stock" or standard parts made by other concerns, a practice that is followed by few vehicle companies. The Detroit line consists of eight models, a clear vision brougham (Model 42), brougham (Model 37), extension brougham (Model 35), brougham (Model 36), roadster coupe (Model 38), limousine (Model 41), roadster (Model 39), victoria (Model 40); which range in price from $2,400 to $5,100.

Low speed motor drives direct to rear axle without intermediate reduction gears or chains. Rear axle and motor one unit in effect, being connected with long tubular casing that acts both as torque rod and tunnel for driving shaft. Universal joints on driving shaft relieve motor and differential of all misalignment strains due to rough roads. When car is fully loaded, motor and driving shaft assume horizontal position by means of ball and socket joint on inner end of motor casing. Special Detroit controller, five forward and reverse speeds, drum type, switch blocks and terminals of rugged design for long service. Thumb adjustment by which spring tension of controller cam may be increased or decreased. Horizontal control lever built into side of car parallel to horizontal steering lever when in use. Both levers may be raised to upright position flat against side of car. Detroit lead storage batteries, standard equipment, Edison cells on special order. Cells divided into two groups, front and rear, accessible by raising front or rear hood. Two sets of internal expanding brakes in each rear hub, controlled by two independent foot pedals on adjustable levers. Third foot pedal between brake pedals operates emergency cut-out switch. Pressure on all three pedals cuts off power supply, brakes then bringing car to stop. Impossible to release brakes without first bringing controller lever to neutral position. Rear axle housing pressed steel, built up in two sections only. Ball bearings throughout on rear axle and differential gears. Front axle I-beam section, with ball thrust bearings under all steering knuckles, Timken roller bearings in hubs of front wheels. Front springs semi-elliptic, rear springs full elliptic with scroll ends. Eyes at ends of springs bushed with bronze with grease cups. Pressed steel frame of channel section, four-inch drop between front and rear axles. Front of frame four inches narrower than rear. Every Detroit model possesses popular low sweeping lines. All body panels, mouldings and window sash shaped from aluminum. Layer of felt matting between roof ribs and aluminum sheet prevents all noise or vibration. White ash sills and pillar posts. Aluminum hoods at front and rear, with full length piano hinges. Full aluminum fenders enclosed between step and body. Doors and windows adjustable drop type, except rear corner panels of curved glass sections, affording unobstructed rear view. Front window in two sash, upper half hinged to swing forward for ventilation. Metal ventilator over front window. Doors open forward. Upholstery and interior appointments have received great care and attention. Double cushion spring. Three shades of upholstering in leather, Bedford or whipcord. Interior metal fittings silver plated white metal. Vulcanized rubber handle grips.

Clear vision brougham, Model 42, has clear vision ahead, at either side and in rear. Very little sash to obstruct view. Front drive type, all passengers facing forward. Two forward seats Pullman type, on line near center of doors, front passenger seat pivoted and may be folded up. Wheel base 96 inches.

Brougham Models 37, 35 and 36 have wheel bases 104 inches, 90 inches and 85 inches respectively, and with this exception and seating arrangement, along same lines as Model 42.

Mercedes type radiator and hood gives roadster coupe, Model 38, same general appearance as gas coupe. Body is roomy, accommodating two persons on rear seat, and a third on folding front seat. Wheel base 96 inches.

Seven passenger limousine, Model 41; wheel base 112 inches. Edison cells, standard equipment, sixty cells, type A-6. Body divided into two compartments with driver's seat in front. Rear compartment seat accommodates three persons; two auxiliary seats in same compartment increases the capacity to five. Seat in front accommodates one person besides driver.

Model 39 roadster, is faster machine than coupe or brougham models. Long, sloping front hood, with a cape top and glass rain shield. Wheel base 96 inches.

The victoria, Model 40, four persons, two on front seat and two on rear, plenty of knee room between seats. Hand buffed enamel leather top with door and side curtains. Battery divided between front and rear hoods. Wheel base 85 inches.

THE ELECTRA

Two light, popular priced electric runabouts are being placed on the market by the Electra Manufacturing Company of San Francisco, California, which are known by the trade name "Electra." By simplifying the construction, the builders have succeeded in filling a long felt want, a low priced but efficient electric car.

Model C sells for $750. Seats two people comfortably; rated maximum speed 20 miles per hour. Weight, 750 pounds, fully equipped. Long Mercedes type hood and scuttle dash. Folding top, two side lights, tail lamp, electric chime horn, and voltammeter. Long and fully enclosed mud guards. "Haschke" lead type storage battery made by builders of car, standard equipment, Edison cells at additional cost of $100. Sixteen cells of Haschke battery under front hood. Twenty-four cells of Edison are required, part installed under seat. Controller lever just under rim of steering wheel gives three forward and three reverse speeds. Special "Haschke" motor has sectional winding, permitting of non-resistance controller. Motor set under floor and connected directly to rear axle through silent gear. Twenty-eight-inch by three-inch pneumatics with Bailey thread. Wheel base 80 inches.

Model D runabout at $1,250, larger and more elaborately equipped car. Body torpedo type, low, straight lines and Mercedes hood. "Radiator" set well back of axle, which gives racy appearance. Same system of control as on small model.

THE GRINNELL

Two models, a coupe and a clear vision brougham, are the product of the Grinnell Electric Car Company of Detroit. The first Grinnell coupe was built in 1906 and since then has been steadily developed to its present stage of perfection. The brougham is strictly a 1913 production, this year marking its first appearance on the market. The front and rear seats of the coupe face each other; the passengers in the brougham all face the front, the fifth passenger in the latter model may face in any direction as this seat is swiveled so that it may be turned in any direction without inconvenience to either the driver or the other passengers.

Special Grinnell motor drives directly to rear axle through universal joint propeller shaft. Special type of drum controller, five forward and reverse speeds through folding horizontal lever at side of car. Service brakes operated electrically through controller. Standard battery equipment of coupe, 30 cells 15 plate WBT, with "no wash" jars, and "non-slop" vents. Cells under hoods at front and rear are readily accessible. Iron Clad Exide cells at additional cost. Forty 13-plate cells of same type in brougham, placed in the same relative position. Pressed steel frame of channel section strongly cross braced and reinforced at corners with gusset plates. Full elliptic springs, 38 inches in length, at front and back. Wheel base of coupe and brougham models 94 and 102 inches respectively. Motz cushion tires, 34x4 inches standard on both cars. Morgan and Wright pneumatics, 32x4 inches, optional. Rated maximum speed 21 miles per hour. Curved tops and gracefully swelling sides on both models. Ventillation through pivoted and divided front window and also through seven-hole metal ventilator over sash.

THE FRITCHLE

Four attractive electric cars are offered by the Fritchle Automobile & Battery Company, Denver, Colo., a five passenger brougham selling at $3,600, a four passenger coupe at $3,000, a four passenger runabout at $2,500, and a two passenger runabout selling for $2,400. In all of these models a special battery and motor is used that is built by the Fritchle company.

Thirty-two cells are used, that are located at both the front and rear of the closed models and under the usual type of hood. In the two runabout models, all of the cells are located under the Renault type hood in the front of the machine. A special Fritchle controller gives five speeds forward and three reverse, operated by a side lever located at the left of the car. Shaft drive is used.

THE HUPP-YEATS

The Hupp-Yeats line of electric vehicles consists of three models, the Model 1A coupe, the coupe "patrician," and a torpedo runabout known as Model 2A. The prices are $1,750, $2,150, and $1,650, respectively, F. O. B. the works at Detroit.

Westinghouse type V33 motor on all models, rated at 26 amperes, 1,600 to 1,700 revolutions per minute. Motor attached directly to rear axle housing and drives through single reduction composed of bevel pinion and large bevel wheel. Front end of motor attached to chassis frame by double spring suspension. Bevel pinion on motor shaft and bevel driving gear aligned by screw adjustment. Ball bearings throughout on rear axle system, of semi-floating type. Twenty-seven cells MV-11 Hycap Exide battery having five-hour discharge rate of 27 amperes in the coupe "1A" and the roadster. Thirty cells MV-13 Hycap Exide in "patrician" coupe, five-hour discharge rate of 32 amperes. Iron Clad Exide at additional cost. Batteries in all models under Renault type hood in front. Westinghouse controller continuous torque type, five speeds forward and two reverse. Floor and running board on line with top of regulation curb, made possible by dropping front axle and springs and bringing pressed steel frame up 9 inches under back seat, from which point it passes over rear axle. Front axle I-beam section, inverted Lemoine type. Knuckle joints provided with ball thrust bearings accurately mounted in dust and waterproof casings. Interior of closed cars amply large for four passengers, front and rear seats arranged so there is plenty of knee room and front seat passengers will not interfere with driver's vision. Rear seats 44½ inches wide, front seat 42½ inches. White ash and poplar frame work with aluminum panels and poplar lining boards in body, roof of three-ply veneer. Roadster with front drop seat for third passenger. Roof of closed cars deeply curved, front edge slightly projected over front of body and considerably lower than rear edge, adding to appearance and reducing head resistance. Internally expanding brakes, operated by foot pedals, act on 12-inch drum. Thirty-eight-inch semi-elliptic springs on the front axle, 43-inch three-quarter elliptic on rear, ends of both sets brass bushed with oil cups. Wheel base of coupe and roadster 86 inches, coupe "patrician" 100 inches. Goodyear Bailey tread electric tires, 34x4 standard equipment, cushion tires at additional cost. Fully enclosed automobile type fenders of enameled sheet iron, cast aluminum running board. Plain French plate glass windows with ebony finish frames on closed models. Rear and door sashes drop. Front and rear quarter windows rigid. Front window divided and pivoted type; top of upper sash may be swung forward to obtain ventilation. Runabout models equipped with folding top, side curtains and wind shield. Dark blue hand buffed leather upholstering, gun metal finish standard on the lower priced cars. Broadcloth and whipcord in higher priced models.

THE OHIO

Four fire-passenger broughams are built by the Ohio Electric Car Company, Toledo, Ohio, that range in price from $2,900 to $3,500. While these cars are all of the same class, there is a considerable difference in the design and body arrangements of the different models.

Crocker-Wheeler series wound motor suspended from frame drive direct to rear axle in all models, three-point cradle suspension relieving strains due to flexure of chassis. Forty cells Exide battery under hoods at front and rear. Magnetic controller at left gives four speeds forward and three reverse. Rear axle full floating type. Rear brakes of expanding type operated by foot pedals. Propeller shaft brake magnetically operated, set by push button. Half elliptic springs in front, three-quarter elliptic rear. Motor slow speed type, connected with rear axle housing through hollow tubular housing that takes place of torque rod. Propeller shaft drives directly to differential bevel without further gearing. Distinctive feature is magnetic control system operated by turning small disc instead of usual controller lever. In effect similar to master controllers used on interurban cars, as it only handles a small part of motor current. Current passing through controller operates magnetic switches that in turn act on main motor current. Switches are located under floor boards. Button controlling magnetic brakes is located on control disc.

THE RAUCH & LANG

The eight models built by the Rauch & Lang Carriage Company, Cleveland, Ohio, cover nearly every body design and requirement of the prospective electric vehicle owner. In this line are three brougham models, accomodating four to five passengers, a four passenger coach, a five passenger town car, a demi-brougham, and two roadster models, one of which is a closed model known as the "club" roadster.

Special compound wound motor, Rauch & Lang-Hertner, suspended from chassis frame directly under foot boards. Drive through propeller shaft to rear axle in usual manner. Rear axle three-quarter floating type. Rear wheel brakes expanding type; contracting armature brakes operated either by foot pedals or hand lever. Flat type controller, lever operated, six forward and three reverse speeds, to twenty miles per hour. Forty cells Exide battery equally divided between front and rear hoods. Controller and lever steer used on all except tower car models located on left of car. Semi-elliptic springs over front axle, full elliptics in rear. Well braced channel section pressed steel frame of ample depth carries batteries and motor. Pneumatic tires either 34x4 inches, or 34x4½ inches, mounted on Stanweld rims, standard equipment, unless cushion tires are specially ordered. Road clearance 11 inches. Except four passenger coach and demi-brougham, which have wheel base of 86 and 105 inches respectively, wheel base is 92 inches. Another exception is made in coach in tire dimensions. All models low hung, floor line in majority of cases only a trifle above hub line. Body work and lines of car are in keeping with high grade of cars, being very graceful and of well balanced design. High arched roof and graceful outlines of door and window openings combine to produce pleasing effect.

THE STANDARD

Two models are built by the Standard Electric Car Company, Jackson, Mich., a brougham known as model "M," and a two seated open roadster type. Both the bodies are low and easily accessible from the street or curb, and are of a graceful and well balanced design. The 96 inch wheel base and long springs insure an easy riding car.

High speed motor mounted near center of the chassis drives to rear axle through double reduction gear without universal joints; axle and motor held in alignment by torque tube. Joint at inner end of motor allows free play without throwing stresses into frame. Motor rated at 1,650 revolutions per minute, normal current of 26 amperes at 48 volts. Two diagonal tie rods running from motor to ends of axle keeps axle tube and motor in exact alignment. Ball bearings throughout driving system and motor. Thirty 11-plate Exide cells in four divisions, two nine-cell and two six-cell trays. Six-cell trays under front hood, remainder in rear; inspected readily by raising rear hood. Controller continuous torque type, six speeds forward and three reverse. Contacts built up on drum that rotates behind contact fingers so wiping contact is made, doing away with possibility of freezing. Frame pressed steel drop type thoroughly braced by gusset plates at points where members interset. Front end of frame "necked" in to decrease turning radius of car. Front axle forging, I-beam section, with hooded knuckles that protect knuckle pins. Three-quarter floating type rear axle, wheel load carried by axle tube, shaft being used simply for transmitting power. Rear axle housing also contains speed reduction gearing. Lever steer all models, arranged to turn up against side of car. Either pneumatics or cushion tires, 32x4 special electric pneumatics standard. Two internal expanding brakes in each rear wheel, completely housed against dust. Two separate pedals operate braking systems, one pedal provided with ratchet.

THE STUDEBAKER

The Studebaker line of electric cars, built by the Studebaker Automobile Company, South Bend, Ind., is divided into two principal classes, the standard chassis Model 17, and a lower priced chassis known as Model 22. Several types of bodies are furnished with either of the models according to the needs of the customer, the body styles ranging from the simple open roadster type to the landaulet.

Special motor mounted well up on chassis drives through chain in both models, center chain drive with Model 17, side chain drive with Model 22. Twenty-six cells 11 plate Exide battery under hoods front and rear of Model 17. Controller of Model 17 provided with shunt speed, control lever being arranged so that lever can only be held on this speed manually and when hand is relaxed or taken from handle, motor is immediately brought back to its highest normal speed. Lever lock is designed so key will not start car unexpectedly when it is inserted. Landaulet body is probably most distinctive in Studebaker line, combining advantages of both coupe and victoria in one body. Rear hood may be pulled down so that body is entirely open above door panel line.

THE WAVERLY

The eight Waverly models, built by the Waverly Company, Indianapolis, Ind., range in price from $1,850 to $3,500, and cover every design common to the electric car. Nearly every model shows a distinct departure from the conventional electric body design that reflects great credit upon the builders.

Waverly motor, four pole series wound type, drives through double reduction consisting of silent chain and herringbone gear. Secondary shaft which lies parallel to rear axle provided with two universal joints, and drives in parallel plane without use of bevel gears. Ball bearings used throughout. Knife blade controller makes contact on each side of brass blade by heavy copper blocks and spring fingers. Speed changes made without breaking circuit and therefore without flashing or burning points of contact. Car cannot be started without first passing through first or lowest speed. Controller is operated through lever located at side of seat, and reverse lever conveniently near control. Lever steer in all except roadster model, arranged so no shock is transmitted to driver's hands, by inclining front axle pivot pins so their axes intersect point where wheels make contact with road. I-beam section front axle with ball thrust bearings at top of each pivot pin. Rear axle full floating type stiffened with truss rods. Differential and driving gears may be removed easily without removing wheels or axle from car. Dual, internal expanding type brakes in each rear wheel: armature shaft brake also provided operated from controller handle, latter brake being of external band contracting type.

Battery equipment depends upon model. Forty cells 11 plate Hycap Exide with the limousine, five-inch Georgian brougham. Forty cells 9-plate Exide or Philadelphia standard with limousine-four and empire brougham; and forty cells of Gould 11 plate in colonial brougham. Waverly coupe and victoria phaeton 32 cell 11-plate Exide or Philadelphia batteries. Roadster, thirty-four 11-plate Hycap Exides. Edison or Hycap Exide optional. In all models floor line is well below center line of hubs, bringing center of gravity very low and making car easy to enter. Low body possible by use of curved sill, and not by underchanging frame as appearance would suggest.

THE WOODS

The Woods Motor Vehicle Company, Chicago, is the maker of seven models, ranging in price from $2,500 to $3,600, that cover every type from the limousine to the roadster. A special motor drives through a propeller shaft and double reduction to the rear axle. A tubular casing that acts as a torque rod combines the motor and axle casings into a single unit. A yoke placed around the motor frame allows a freedom of motor movement that prevents any strain from being thrown into the torque tube or frame. Imported annular bearings are used throughout the driving system.

Speed control by horizontal lever placed parallel with steering lever; reverse lever near end of speed control works independently of main contactor. Five forward and five reverse speeds. By reason of interlocking device between control lever and reverse it is impossible to reverse car or start it on any speed except first after current has been cut off. By pulling controller lever a little back of neutral or power-off position, armature brakes are brought into play. Except extension limousine with forty-two cells, all models are equipped with forty cell, 11 plate battery of special manufacture. Cells about equally divided between front and back hoods. Controlling and lighting system arranged so power and lighting currents are drawn equally from front and rear batteries. No rheostat or resistance used in controlling system. Rear axles full floating type. Housing of one piece stampings reinforced by truss and radius rods. Front axle I-beam section with ball thrust bearings, and has considerable drop that reduces height of car and at same time allows proper height of spring. Pressed steel frame of channel section brings body within short distance of the road. Two sets of brakes. One set, operated by control lever, consists of contracting band on armature shaft; the other pedal operated internal expanding type that acts on the brake drums connected with rear wheels. Car can be controlled by either set.

Claims England a Market for Electrics

From Consul Albert Halstead, Birmingham, England, comes the following report as to an open field for electric motor cars. His office has had considerable correspondence with American manufacturers of electrically propelled vehicles who were considering their introduction into the United Kingdom. A number of years ago an effort was made to popularize the electric vehicle there, but troubles with batteries, difficulties of construction, and poor design prevented its sale. Since the remarkable improvements in storage batteries and design made by American manufacturers all these drawbacks have been removed. The price of electricity is sufficiently low to make the use of electric vehicles profitable for commercial purposes, but the difficulty has been and continues to be that the electric supply companies and the municipal electric supply departments have not encouraged the use of electricity as they might have done with profit.

An article on the subject in the English *Hardware Trade Journal* of March 14, says:

> The makers of electric vehicles seem to be rather neglecting their chances just now. With the rapid rise in the price of petrol (gasoline), which was little more than 25 cents a gallon 12 months ago and is now 43 cents, an increase of 75 per cent, the disadvantage of the comparatively high running cost under which the electrically driven vehicle labored has disappeared, and with electrical energy at its present price, and a certainty that it will be reduced rather than increased in the near future, a tradesman could run a small electric carrier more cheaply than one which depended on petrol. The latter under most favorable conditions would run only some 45 or 50 miles per gallon. Excluding all other costs but that of petrol, as tires would be common to both types of vehicle, it costs, roughly, 43 cents to travel 42 miles or 1 cent a mile. And in excluding other costs we are treating the petrol carriers very fairly, as a quart of oil costing about 24 to 36 cents would be required every 350 miles or thereabouts with a petrol engine, and with an electric motor a cupful of oil would last a good many months. A 6-horsepower petrol motor would, roughly, be of about 900 cubic centimeters capacity as regards cylinders, or about 9 actual horsepower. An electric motor of 9 horsepower would take about 10,000 watts, or, roughly, 10 units per hour, which at 1 cent per unit—a common price now for battery charging—would be 10 cents for about 20 miles. For 42 miles the electric motor would cost about 22 cents compared with the 43 cents of the petrol-driven vehicle. Of course these figures are largely approximate, but it would appear that the hardware man engaged in the electrical trade might do worse than get in touch with the makers of small electrically propelled vehicles and see what prospects there are of trade.

It would seem in these circumstances as if makers of electric automobiles in the United States might well investigate the British market and arrange with electric supply companies and municipal electric supply departments to facilitate battery charging. Already three American electric automobiles have been introduced in London for commercial purposes, but whether others have followed is not stated.

The Electric is Everybody's Car

The electric car has a field peculiarly its own and the same is true of the gas car. Each has an industrial mission with whose fulfillment the other cannot interfere. And yet there are certain features in which these two domains apparently overlap, and in some important particulars the gas car does not come out of the competition unscratched. If the time ever comes when the electric becomes a bona fide touring car, the gas car will have to look to its laurels, and the coming of this time would seem to be foreshadowed when an electric is used for a Glidden pathfinder and when electric trucks make transcontinental trips.

Taking everything into consideration and especially the marvelous development of the electric, the makers have every reason to be optimistic over the outlook, and that is exactly the frame of mind in which they face the coming season.

The electric car fills out a full line of motor cars. It may be driven by the entire family, whether any member of it may be accustomed to a gasoline car or not.

Expense is saved by substituting the electric car in winter for the gasoline machine, in gas, oil and incidental purchases for the larger motor and in the wages of a chauffeur.

The electric car is always ready and charged, and emancipates the family from the slavery to a chauffeur.

Possession of an electric car prevents the family from being discommoded when the gasoline car is being overhauled during the winter.

Exceptional public service is given the electric car owner. The machine is delivered, called for and charged without exercising the owner's solicitude.

While the electric first was associated with women, and it was considered rather effeminate for a man to be seen driving one, it now has developed to such an extent the business man finds it almost as handy for town use as he does the big gas car. The 1913 electric is chiefly characterized by its "manliness," and it is estimated they will be more extensively used as town cars by business men this season.

The electric is found to be the best supplement to the gas car in winter and easily finds a sale in the class that employs a gas car for travel in warm weather.

B. Altman & Company, New York's most exclusive department store, have just placed their third order within a year for G. V. Electric wagons. The order calls for six more 1,000-lb. machines, making fifteen in all.

Praise for Electric Trucks

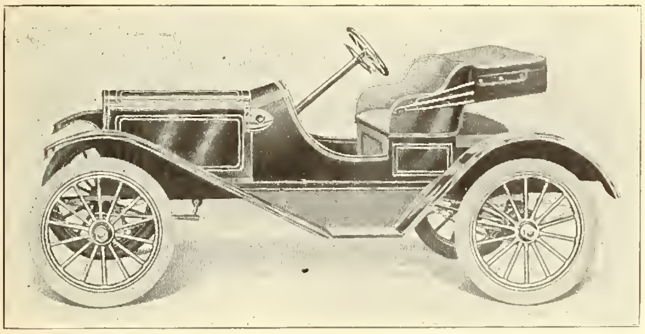
The Commercial Truck Company of America is in receipt of two interesting letters from customers that not only reflect great credit upon the product but upon the electric truck in general, when compared with horse traction.

The first letter, from Henry Disston & Sons, the saw manufacturers, state that two 2-ton commercial trucks perform their work with four men that formerly required the services of 12 men and several horses. In addition to this economy, the work is done much more quickly than when horses were the propelling medium.

A letter from the A. Mecky Company, which has been using a Commercial truck for over a year, orders a second truck. During this period, the electric truck has continuously performed the work of two teams, and at times, of three. The company states that it has never experienced any trouble with the truck, and that it would never willingly return to the horse. As this company leaves the truck in the driveway over night, it saves much in space and rentals.

New California Company

The Electra Manufacturing Company, of 11 Jones street, San Francisco, Cal., has incorporated under the laws of California for $250,000, and is planning for the immediate manufacture of the "Electra" automobiles, both pleasure and commercial. The Electra was formerly built by the Storage Battery Power Company. The car is built under the Haschke patents, and under the direct superintendence of J. Haschke, the chief engineer of the new company. A description of the car will be found elsewhere in the number.



Model "C" Electra Car.

Electric Makes Good in Road Test

The assumption that the electric will not make trips of any distance on one charge or attain sufficient speed to be really serviceable, received a setback when a Standard electric was recently driven from Cleveland to Elyria and back at good speed and with no indication of failure of electricity by F. L. Morgan, of the local Standard electric branch. The running of the car was done entirely on fourth and fifth speeds.

The voltage shown at the start of the trip was sixty-one, the batteries having previously been run a distance of about 4,700 miles.

Kamms corners were reached at 8:55 with a drop of one volt. Ridgeville at 9:30 with a further drop of one volt. Elyria was reached at 9:50 and the voltage stood at fifty-nine. Total distance traveled to that point was thirty-two miles.

Ten miles were consumer in traveling about Elyria with five people in the car. The voltage at this time still remained at fifty-nine.

The car left Elyria at 12:30, arriving in Cleveland at 2 p. m. The short route was taken on this return trip and the total milage was sixty-nine, voltage fifty-seven, showing a very slight drop for this distance. Seven miles were then consumed in the city of Cleveland and the car was still running with a voltage of fifty-four at the time it was put in the garage for the night, having covered a total of seventy-six miles. In estimating the remaining juice it would be fair to say that the car could have been run at least fifteen miles further before being recharged.

Great Improvement in Car Construction

"The average prospective purchaser of an automobile does not realize that the electric of today shows a tremendous improvement over the models built a few years ago," says W. B. Brantley of the Central Garage Company at Nashville, Tenn. "He does not stop to think that years of experience have brought about such a marked evolution in the type that the efficiency of an electric pleasure car or an electric commercial vehicle is nothing short of remarkable.

"The motorist recalls models of a decade back which carried a ton or more of storage batteries around at a very slow pace, and it is true that a great many people are still under the false impression that present models are much the same. Ten years ago, when the electric car was first struggling for recognition, many rash statements and promises were made, especially regarding the mileage it was possible to make on a single battery charge. It almost always happened that cars were falling short of these claims, and as a result the electric lost much of the prestige it should rightly have enjoyed.

"Even during the early days, however, the electric was found to have qualities of cleanliness, simplicity, ease of operation and control, silence and freedom from mechanical annoyance, which made for it many enthusiastic and lasting friends. The original drawbacks, such as insufficient mileage and lack of speed and carrying capacity, have been overcome, due to a very decided improvement in batteries, motors, bearings (reducing frictional resistance) and transmission mechanism. There has undoubtedly been a greater advance in electrics than in any other type of motor car, and there is no question of doubt that the electric vehicle has a great future.

"Its principal field of usefulness now is in the cities, because the great majority of such service comes within the limits of 50 to 100 miles. The maximum demand for commercial vehicles in city service is about 60 miles. So many mercantile houses are employing the electric commercial car that its efficiency and general all-around serviceability are universally known."

But One Electric Car Company in Italy

The Societa Torinese Automobili Elettrici of Turin, in five years of existence had built several heavy trucks furnished with Tudor accumulators and lately with an American motor, as being the most suitable, and a few pleasure cars, both small and large. Owing to the insignificant demand in the department and in Italy in general, however, the company was forced into liquidation last year, so that now there is in Italy only one company, located in Milan, for the construction of electric automobiles. Although most of the Italian cities, being furnished with electric plants, can offer every convenience for the charging of the batteries at reasonable prices, gasoline automobiles are preferred. The comparatively small size of the cities and their usually hilly location and surroundings are not in favor of the use of electric pleasure automobiles. There may be still a small market for electric trucks, however, these being often adopted by municipalities for watering the streets, and by gas works for the delivery of coal.

Large Railway Order for Electric Trucks

That the New York Railways Company believes it has found a solution for the shortcoming of horse-drawn wagon service is evidenced by the $100,000 order for electric commercial vehicles placed with one company recently.

The order calls for the following:

1— 1,000 lb. wagon with express type body.
2— 1,000 lb. wagons with panel bodies.
1— 2,000 lb. panel money wagon.
5— 4,000 lb. emergency wagons.
14— 7,000 lb. trucks with steel dumping bodies, with hand operated dumping devices.
4— 7,000 lb. trucks with platform and stake bodies.
2—10,000 lb. trucks with platform and stake bodies.

It will be noted that with the exception of tower wagons and pump wagons, which will doubtless be utilized later on, practically all special applications of the modern electric truck will be utilized in this representative installation. The 1,000-lb. wagons will handle special package deliveries, and the money wagon is a type already used by the express companies and banks. The 7,000-lb. dumping trucks are understood to be the last word in design and operating efficiency, although the dumping devices are hand operated. This may be due to the fact that there is a feeling in the minds of many engineers that the majority of automatic dumping devices on all types of motor trucks are too complicated to warrant universal adoption. The other 7,000-lb. trucks will be used in general hauling, and the 10,000-lb. trucks, equipped with windlass, are probably intended for cable work.

No one studying the wide range of uses to which the electric truck is put in central station and electric railway work will say that it is not elastic or capable of adapting itself to such work in any part of the country. For years we have had electrics for the wiring department, supply department, lamp department, underground repairs, etc. We have had meter wagons, cable wagons, gas service wagons, trucks hoist equipped, winch equipped, all kinds of emergency and tower wagons, including trolley tower wagons which run either on rails or pavement by exchanging wheels, and the end is not yet.

With the general improvement in batteries and with a marked growth in the knowledge of scientific operation, the electric bids fair to displace the horse to a wonderful degree in all lines of work in a short time. It was to be expected that the express companies, department stores, brewers and wholesale houses would adopt it, especially for city work, and that central stations would at least experiment with a current consuming device of such large proportions. The endorsement of the New York Railways Company, however, should have a marked influence on the purchase of electrics by other lines throughout the country.

Electric Mail Wagons in Berlin

Experiments with a new type of light electrically propelled vehicles for the distribution of mail have been made in Berlin and a number of the cars have been purchased. The car is the type of the so-styled "cyclecar," which has become so popular within the last year in England. The maximum speed of these cars is 18 miles an hour, carrying a weight of 500 pounds. The capacity of the battery permits a working radius of forty miles on a single charge.

The first butcher in New England to adopt the motor vehicle is George A. Hart of Essex, Mass. He has been doing business over these routes during the past fifteen or twenty years with high-grade horses and custom-built butcher's cart of the familiar country type. He has equipped with standard General Vehicle electric chassis his familiar butcher wagon bodies. This equipment is a novelty and at the same time shows enterprise. These modern, old-style butcher carts will be kept and charged with electricity in one corner of Mr. Hart's stable, and the care will be far less than that which the horses have required in the past. Electricity from the Gloucester Electric Light Company's plant will cost less than the former bills for hay and oats.

A deal of importance in the local automobile field was closed recently, when the Electric Sales Company, 1716 Broadway, Seattle, Wash., signed up for the agency for the Waverly electric, which will be handled in conjunction with the Standard, Baker and Woods electric machines. The Waverly half-ton truck has met with much success in the East, and the Baker commercial models, which range in carrying capacity from 750 pounds to eight tons, also have gained a strong foothold.

In order to enable it to offer downtown garage and salesroom facilities to prospective buyers and owners of Broc electrics, the Broc Electric Vehicle Company has opened quarters in the new Euclid square garage building on East 13th street, Cleveland, Ohio. Heretofore both salesroom and service station were located at the factory, Payne avenue and E. 40th street.

The Farrington Automobile Company, Chicago agent of the Ohio Electric, has moved to 436 South Michigan avenue. R. S. Woodhull is sales manager of the Ohio Electric company. Eight cars can be shown on the floor without crowding.

The United Service Company, of Scranton, Pa., which operates gas and electric properties in Ohio, Indiana and Pennsylvania, is planning to erect a 7,000 horsepower generating station at Coshocton, Ohio.

The Van Auken Electric Car Company, Connersville, has incorporated with a capital of $10,000. Directors: G. C. Babcock, A. K. Babcock, C. L. Millard, B. D. Millard, H. M. Wylie.

Cut out your lights when charging the car.

An Electric Vehicle Dictionary

Simple Definitions of Technical Terms that Are Frequently Used

Acid.—A compound of hydrogen that combines with metals or alkalis to form neutral compounds known as "salts." When an acid contains oxygen in its composition, the terminal *"ic"* is generally added after the qualifying word as in "sulphur*ic*," "nitr*ic*," etc.

Acid, Battery.—The battery acid used in lead cells is a dilute solution of sulphuric acid (H_2SO_4) in water. When combining with the lead plates of the cell it forms a salt known as lead sulphate, and sets the hydrogen free during the process. The addition of sulphuric acid to the water of the electrolyte greatly reduces the electrical resistance of the latter, and increases its temperature during the mixing. The specific gravity of battery acid before mixing with the water varies between 1.835 and 1.842.

Active Material.—The soft material surrounding the metallic portions of the battery plates which enters into the electrochemical action between the plates and the battery solution. The active material on the positive plate consists of lead peroxide; that on the negative consists of finely divided or spongy metallic lead when the cell is fully charged. When fully or partially discharged the sulphuric acid in the solution converts more or less of the active material on both plates into lead sulphate, the percentage depending upon the extent of the charge remaining in the cell. When fully charged the positive plates of a lead battery are of a dark reddish brown or chocolate color, while the negative plates are gray or slate colored. The active material on both plates is very soft and easily dislodged from the plates unless thoroughly bound in place by the metallic portions of the plates. The binding of the active material has been one of the principal problems of the battery maker. The active material of the Edison cell differs greatly from that of the lead cell, consisting as it does of nickel flakes contained in nickel steel tubes.

Air Gap.—The space or clearance between the armature and field poles of an electric motor.

Alkali.—Metals or the salts of metals that are chemically the opposites of the acids, and which form slats by their combination with the acids. Among the alkaline metals are sodium, potassium and magnesium. The electrolyte or battery solution used in the Edison storage cells are alkaline, being a solution of potassium and magnesium hydroxide. These salts when added to the water of the electrolyte greatly reduce its resistance.

Alternating Current.—A current which changes its direction of flow periodically and therefore has no particular polarity except at some particular instant. The reversals are known as "alternations," and the number of double reversals or "round trips" are called the periods, one period being composed of an outward and return trip. The number of periods occurring per second is called the "frequency" of the current. The most common frequencies are 25, 60 and 140 cycles per second. Alternating current can not be used directly for charging a storage battery, but must be "rectified" or changed into a continuously flowing current before being passed through the cells.

Ampere.—The electrical unit of the rate of current flow. This may be taken as equivalent to saying that a water pump has a capacity of so many gallons per minute. The rate at which a current flows through a conductor is stated in amperes.

Ampere Hours.—The product of the current in amperes by the time in hours that it has been flowing in the circuit. If a current of 30 amperes has been flowing for 4 hours, the result stated in ampere hours is $30 \times 4 = 120$ ampere hours. The ampere-hour is usually taken as the unit of capacity of a storage cell, a certain cell being described as having a capacity of so many ampere hours, or, in other words, of being capable of so many amperes of flow for a certain number of hours.

Ammeter.—An instrument for measuring the rate of flow of an electrical current in amperes.

Arc.—The spark or flame caused by opening a circuit carrying a current of electricity. When the controller cuts off the power an arc is formed at the point where the circuit is broken.

Arcless Metal.—A special alloy that extinguishes an electrical arc passing from its surface by forming a coat of nonconducting metallic oxide at that point that cuts off the current.

Armature.—The revolving drum of the motor on which the moving wire is wound. The attraction of the magnetic flux of the wire on the armature for the magnetism of the stationary field pieces produces the power. The armature drum consists of a cylindrical pile of thin sheet steel discs provided with slots in which the conductors are laid.

Armature Shaft.—The shaft on which the armature drum is mounted and which conveys the energy of the armature to the driving or reduction gear. The armature shaft ends a few inches outside of the motor casing and does not extend to the rear axle, this prolonged shaft being known as the propeller shaft.

Armature Connection.—The binding posts or terminal connected with the armature through the commutator and brushes.

Armatube Brake.—A brake mounted on the armature shaft or an extension of the armature shaft. Owing to the leverage gained by the reduction gearing between the motor and the rear wheels, the armature brake is much more effective for a given amount of friction than those mounted directly on the rear wheels.

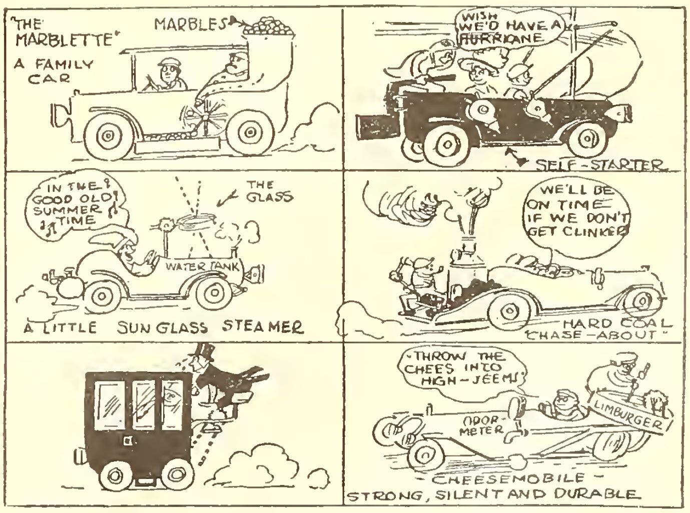
Battery.—A device used for producing electrical energy by the chemical action of a fluid on two dissimilar metallic plates. The electrical energy generated by the battery erpresents the energy expended on the elements of the fluid in bringing them into combination. When the fluid enters into combination with the metal plates of the battery they are reduced to a lower form or chemical position of potential and therefore yield this energy, partly in the form of electricity and partly as heat. According to ordinary usage, the term "battery" means a number of current producing elements or "cells" taken as a group, thus it is often said that "a vehicle has a battery of forty cells."

Battery Acid.—See *Acid, Battery.*

Battery, Primary.—A chemical battery in which the fluid and positive plate are totally consumed in producing the current. When consumed these elements are replaced by new material. The current is therefore obtained from a primary source and not from energy generated from another energy producing unit. The dry battery and sal ammoniac cell are examples of primary batteries.

Battery, Secondary (Storage Cell).—The fluid and plates of a secondary battery are not consumed in producing current, as in the case of the primary battery, the renewal being accomplished by passing a current of electricity through the cell that changes the elements back to their original form. The secondary cell, of which the storage battery is the only example, really receives its energy in the form of energy and not in the form of an unstable chemical compound. When the battery elements of this class of cell are reduced to their lowest chemical state during the discharge, they are returned to their original form by breaking up their chemical affinity for one another. The current used for this purpose is known as the charging current.

Battery Tray.—A removable container in a vehicle that


"THE MARBLETTE"
A FAMILY CAR
MARBLES
WISH WE'D HAVE A HURRICANE
SELF-STARTER
IN THE GOOD OLD SUMMER TIME
THE GLASS
WATER TANK
A LITTLE SUN GLASS STEAMER
WE'LL BE ON TIME IF WE DON'T GET CLINKERS
HARD COAL "CHASE-ABOUT"
"THROW THE CHEES INTO HIGH-JEEMS"
ODOR-METER
LIMBURGER
- CHEESEMOBILE -
STRONG, SILENT AND DURABLE

"If the Price of Gasoline Goes Up," by Stanley in the Cleveland Press. As a Last Thought, Why Not Use an Electric?

holds a number of the cells together in a unit so that they may be easily removed and handled.

Bevel Gear.—A gear used for transmitting power between two shafts that lie at right angles to one another. The faces of bevel gears are frustrums of cones whose apex is at the intersection point of the two shafts.

Band Brakes.—A brake consisting of a contracting or expanding band that makes frictional contact with a revolving pulley or drum. The band is usually the stationary element of the band brake, the drum being attached to the rear wheels or to the armature shaft.

Brake, Armature.—See *Armature Brake.*

Brakes, .Internal Expanding.—The band or stationary faces of an internal expanding brake are placed inside of, and act against the inner face of the drum. This type of brake is nearly always used on the rear wheels, as the enclosing drum keeps the frictional surfaces free from mud and dust.

Brakes, External Contracting.—The band in this type of brake surrounds the outer circumference of the drum, and acts by contracting on the drum. This type is nearly always used on the armature shaft, a position in which it is protected from the greater part of the dirt and where it may be easily adjusted.

Brake, Armature.—See *Armature Brake.*

Boiling.—An action of the battery fluid much resembling the boiling of water. Caused by excessive liberation of gas bubbles from the battery plates, through a high current or by continuing the full charging current after the cell is fully charged.

Brushes.—A form of contact by which the current is led into the revolving armature through the commutator. The brushes consist of carbon strips that are held stationary by insulated studs, and which make contact with the bare copper bars of a revolving drum known as the "commutator." As the brushes are connected with the battery current, the current passes through the brushes, through the commutator bars, and into the armature coils to which the bars are connected.

Breaker, Circuit.—An automatic device arranged in the charging circuit so that an over-load or a reversal in the direction of the current breaks the circuit. This prevents too much current from passing through the cells, and also prevents the cells from discharging into the main, should the voltage of the battery become higher than that of the supply.

Boosts.—Intermittent charges given to a vehicle battery at frequent intervals before the battery is totally discharged.

Burning Lead.—All of the plates of similar polarity in a lead cell are connected to a common lead bar by a process known as "burning." The joints in this case are really welded together by means of a blow pipe, a small portion of the lead at the joint being melted and run together. Solder is not practical in making a lead joint.

Buckling.—An excessive rate of charge or discharge, or excessive sulphation, will distort the plate, a condition known as "buckling." When a plate buckles it causes a short circuit by coming into contact with the adjacent plates, which are of opposite polarity. If the plate does not come into contact with the others, twisting will loosen the active material, and reduce the capacity through the increased resistance and loss of contact with the greater part of the active material.

Bus-Bars.—The main conductors on a switchboard, so named because they are in the form of copper rods. The lead strips connecting the plates of similar polarity in a storage cell are also called bus-bars.

Cell.—A single unit of a storage battery, consisting of the plates and containing vessel.

Circuit.—The complete path of an electric current.

Circuit, Open.—A circuit that is broken at some point so that the current cannot flow.

Citcuit, Closed.—A complete circuit, with no breaks or interruptions to the current.

Circuit, Short.—An accidental conducting path introduced into the circuit that provides a shorter path for the current and therefore prevents it from reaching its intended destination.

Circuit Breaker.—See *Breaker, Circuit.*

Chassis.—The running gear of an automobile, including the power plant, the under frame, wheels, axles, etc.

Commutator.—A drum built up of copper bars mounted on the armature shaft. Each of the bars is insulated from the adjacent bars, and is connected to a coil in the armature. The brushes that make contact with the tops of the bars are connected with the battery. The purpose of the commutator is to supply the armature coils with current as they come into the magnetic influence of the field, so that the coils will always tend to pull forward in the direction of rotation.

Connection.—Fastening the conductors of the circuit to some part of the apparatus that is to be included in the circuit.

Conduit.—A pipe for carrying the wiring, and protecting it from injury and moisture.

Controller.—A form of switch used for regulating the speed of the motor. This consists of a number of contacts that alter the amount of voltage supplied to the motor, and which change the relation of the motor wiring.

Controller Lever.—A lever in the car by which the controller is operated.

Converter.—A form of combined motor and dynamo used for converting alternating current into direct current. It is used only for comparatively heavy currents, a rectifier being used for the batteries of small cars. (See *Rectifier.*) The direct current obtained from the dynamo end of the converter is used for charging storage batteries.

Demand Meter.—A demand meter is sometimes installed by the electric company for the purpose of determining the maximum amount of current used by a consumer at one time. The cost of current is less with a low reading of the demand meter, since the central station can furnish a given amount of energy cheaper if taken continuously at a low rate than it can if it is taken with a sudden rush. If a number of cars are to be charged it will be cheaper to charge them one at a time throughout the day than to charge them all at the same time. The demand meter is really a meter that figures discounts.

Density.—The relative weight of matter. When finding the relative weight of a liquid, such as a battery fluid, the weight of a given volume of the fluid is compared with the weight of an equal volume of water. The relation between the weight is expressed as specific gravity.

Differential.—A device usually placed on the rear axle that allows one wheel to turn faster than the other when turning the corner, and at the same time allows the power to be applied equally to each wheel without regard to its relative speed.

Drop.—The amount of voltage lost or "dropped" on a circuit due to the resistance of the conductors.

Drop Frame.—A chassis frame that is bent or curved down over the axles to obtain a low body.

Efficiency.—The efficiency of a machine is the ratio of the useful work obtained from it to the amount of energy supplied. If 30 horsepower is applied to a motor, and we obtain 50 useful horsepower at the wheels for propulsion, the motor is said to have an efficiency of 50 per cent, since we utilize 50 per cent of the amount supplied.

Electrode.—When current is passed through a fluid or is taken from a battery cell, the plates or conductors that make contact with the fluid are called electrodes. Thus the plates of a storage battery are electrodes, since they form the ends of conductors that close the cell circuit.

Electrolyte.—The battery solution.

Field Coils.—The magnetizing coils that surround the armature of the motor (stationary). The magnetism caused by the field coils acts with the magnetic flux produced by the armature windings in obtaining the rotation of the armature.

Faure Plate.—A storage battery plate in which the active material is applied in the form of a paste.

Freezing.—When the contacts of a circuit carrying a heavy current make imperfect contact, or when the arc caused by opening the contacts is long continued, the heat melts a portion of the contact surfaces, with the result that they fuse or stick together. This welding action is known as "freezing,' and has caused considerable trouble in controllers that open the complete circuit for every change in speed.

Fuse.—A wire made of some metal having a low melting temperature, used for the protection of the circuit against an excessive current. If the current exceeds a predetermined amount, the heat generated melts the fuse and opens the circuit before injury is done to the battery or motor.

Gassing.—When an excessive amount of charging current is sent through the cells, or when the cell nears the end of the charge, the plates are no longer able to absorb all of the gas liberated. The excess of gas thus formed passes up through the electrolyte and escapes to the air. With a normal current, gassing indicates the end of the charge.

Grid.—The latticed lead portion of the plate that supports the active material.

Horsepower.—The mechanical unit of power or the rate of doing work. The horsepower is equal to 33,000 foot-pounds of work per minute, or is equal to the force in pounds multiplied by the velocity of the object in feet per minute, divided by 33,000. The horsepower is equal to 0.746 of a kilowatt.

H. P.—The abbreviation of horsepower.

Hydrometer.—An instrument for measuring the density or specific gravity of a fluid.

Hydrogen.—An elementary gas, that appears at the negative electrode or plate of a storage battery during the charging process.

Insulator.—A substance that is a non-conductor of electricity.

Kilowatt.—A kilowatt is equal to one thousand watts (See *Watts*), and is used in the measurement of electrical power in practice as the watt is inconveniently small. Roughly, a kilowatt is equal to 1.33 horsepower.

Kilowatt Hour.—The work done by one kilowatt in one hour. The product of the number of kilowatts expended in a circuit by the number of hours.

Kilowatt-Hour Meter.—See *Meter, Kilowatt-Hour.*

Leads.—The conductors or wires leading to the battery or motor, from the main circuit.

Lead Burning.—See *Burning, Lead.*

Mains.—The principal part of the circuit from which the leads branch off. In ordinary practice, the word "mains" usually refers to the circuit or line of the power company from which the power is taken.

Meter, Kilowatt Hour.—The meter installed by the electric power company for the measurement of the kilowatt hours used by the consumer.

Multiple.—A system of making connections. A piece of apparatus is connected in multiple with the main circuit when a wire from each terminal is connected to the corresponding main wires. When batteries are connected in multiple, the positive poles of the batteries are connected to one lead and the negatives are connected to the other.

Negative Pole.—The pole or terminal of a battery to which the current is assumed to flow. The negative pole of a battery is that to which the current returns after flowing through the circuit.

Oxygen.—The gas given off the positive plates of the cell when under charge.

Plante Plate.—A lead storage battery plate on which the active material is formed by the continued action of a charging or "forming" current. At the start of the operation, plain lead plates are used, the peroxide and spongy lead being the result of the current and chemical action of the electrolyte.

Polarity.—The term "polarity" refers to the direction of current flow in the circuit, the current being assumed as flowing from one pole or terminal of the apparatus to the other. One pole is known as the "positive" and the other as the "negative."

Positive Pole.—The positive pole of a battery is the pole from which the current is supposed to issue. The positive pole of the motor is the terminal at which the current enters, the current flowing from the battery to the motor.

Reactance Coils.—Coils used on the mercury converter for maintaining the arc after the current wave has died out. These coils consist of a number of turns of copper wire wound around a sheet iron core, the magnetism of which generates a temporary current in the coils as the main current dies out.

Radius Rod.—A rod extending from the rear axle to the frame of a chain-driven vehicle, the purpose of which is to keep a constant distance between the motor sprocket and the axle, so that the chain will not be loosened or tightened by the flexure of the springs.

Reduction Gear.—A gear used to reduce the high speed of the motor to the comparatively low speed of the road wheels.

Revolutions Per Minute.—The number of complete turns made by a revolving body in one minute.

R. P. M.—The abbreviation for revolutions per minute.

Shipment of General Motors Trucks (Reorder) for the Philippines.

Rectifier.—An electrical apparatus used for converting alternating current into direct current for use in charging storage batteries.

Resistance, Electrical.—The opposition offered to the flow of electricity by a conductor. It may be compared to the friction met in mechanical appliances. The unit of electrical resistance is the *Ohm.*

Rheostat.—A device consisting of high resistance wire that is used to vary the current in a circuit by increasing or decreasing the resistance of the rheostat coils.

Series Connections.—When the terminal of one piece of apparatus is connected to the terminal of the next in such a way that all of the current flows through all of the apparatus in succession, the apparatus is said to be connected in "series."

Separators.—Thin insulating strips placed between the plates of a storage battery.

Short Circuit.—See *Circuit, Short.*

Shedding.—A storage battery is said to be shedding when the active material is being torn from the plates by the action of charge or discharge, in more than the usual amount.

Storage Battery.—See *Battery, Secondary.*

Sulphation.—When the active material is affected by the sulphuric acid in the electrolyte so that a considerable proportion of it is changed into lead sulphate, the battery is said to be sulphated. Sulphation reduces the capacity of a cell, and if allowed to proceed far enough will ruin it.

Specific Gravity.—The ratio of the weight of a given substance to the weight of an equal volume of water.

Torque.—The turning effort of the motor, or, in other words, the pull in pounds at a fixed distance from the center of either the armature shaft or rear axle.

Torque Tube.—A rigid tube connecting the rear axle and frame, that prevents the torque or turning effort of the motor from turning the rear axle against the springs.

Tractive Effort.—The pull of the car in pounds against a fixed point.

Volt.—The electrical unit of pressure or intensity.

Indianapolis a Pioneer in use of Electrics

Indianapolis is great in an automobile manufacturing way and, because of its wide streets and avenues, great as a city of automobile enjoyment, says Andrew C. Fearing of the Ohio Electric Sales Agency. For the man, the gas car may be the most satisfactory, but for the woman driver there is nothing like the electric for easy comfort, luxuriousness and cleanliness.

The electric has been popular with the people of Indianapolis. Among the first of the electrics were manufactured there—the people early learned to drive them. Indianapolis has a large proportion of electric cars on the streets. There was a big increase in the number of cars sold in Indianapolis last year and there will be a larger increase in 1913.

Mere man might have been tardy in finding out the advantages of the electric had not the other sex become enthusiastic. For a starter, it has the great advantage of being easily driven. Undoubtedly the electric presents fewer problems than the gasoline car, though it is a fact that many women are now skilled drivers of the latter type. Its cleanliness formed another item in its favor. The absence of gasoline, the lock of odor, all constituted a combination calculated to appeal to a woman's superior sensibilities. Manufacturers were not slow to seize their advantage, and by constructing the most artistic and comfortable bodies for their electrics added in their irresistibility.

The voltage of a storage cell varies with the density of the electrolyte and the character of the electrodes, and is independent of the cell size.

All of the battery connections should be gone over periodically and should be carefully cleaned or tightened.

Mechanism of Electric Cars Taught

A series of educational talks on the electric automobile were recently given for the public at the showroom of the Electric Automobile Company, 725 Third street, Louisville, Ky. It was the purpose of these talks to educate prospective buyers of electrics more thoroughly in the subject. In the belief that electric cars have been bought too freely on appearance instead of mechanical fitness, it is desired to give honest instruction in what is best to look for and what to avoid; how to squander or to save money; the matter of tires for the electric and a great many other important details.

Points were illustrated by means of a chassis of the Chicago Electric and parts and various finished models were on exhibit. The talks were delivered by an expert of high standing. Women especially were invited, as it is realized that to them most often falls the part of buying the electric car.

An Ohio Trackless Trolley

The Ohio Electric Car Company of Toledo, Ohio, has recently completed a bus that is to be operated as a trackless trolley in Merrill, Wis. It will be operated by the Merrill Railway and Light Company of that city on an extension to its regular lines. While this system has been in use in Europe for several years, it is rather new in this country and the progress of the scheme will be watched with great interest.

Ohio Electric Bus for the Field Electric Bus Company.

The Electric Vehicle in Brooklyn

In Brooklyn the electric auto has been enjoying great popularity, and many of the big retail commercial houses have found that there is nothing quite so economical and handy for city deliveries. The average electric commercial machine will travel fifty miles a day on one charge, and will cover during the day at least twice the distance of the old horse-drawn wagon, as well as being vastly more cleanly and convenient.

A sure indication of the efficiency and desirability of this type of wagon is the fact that the large department stores have adopted them almost exclusively for city deliveries. In this borough Abraham & Straus and Frederick Loeser & Co. are both large users of electric vehicles, having between them upwards of 150 such wagons. They are rapidly replacing all their horse-drawn vehicles with electrics. Adams Express Company, White's Express and other large companies use electrics exclusively for city deliveries.

However, the electric vehicle in its present stage of development is so useful and so easily maintained that its use is not limited by any means to large organizations. The small corner grocer is now beginning to use the electric vehicle and finds that it is not only an economical and efficient method of delivery, but that it is an excellent advertisement for his business.

The electric pleasure vehicle is being constructed by a number of reliable manufacturers on a very large scale. Brooklyn seems to be a little behindhand in their use compared with the other large cities, but as people are becoming more familiar with the advantages of the electric, more and more are they coming into general use.

List of Electric Car Users Grow

The following is a constantly growing list of a few users representing an investment of about $5,000,000 in electric vehicles in operation and on order:

Adams Express Company	250
New York Edison Company	95
Ward-Corby Company	64
United Dressed Beef Company	22
American Express Company	106
Case & Martin Company	100
Gimbel Brothers	96
Frederick Loser Company	26
Rochester Railway and Light Company	52
H. B. Chaffin & Co.	23
Ward Packing Company	200
General Electric Company	44
Siegel, Cooper Company	15
George Ehret Company	42
R. H. Macy & Co.	39
Public Service Electric Company	12
Commonwealth Edison Company	32
Independent M. & D. Service	24
Central Brewing Company	14
J. Taylor Dry Goods Company	10
Chapman Sacks Company	13
F. A. Poth & Sons	24
Rio de Janeiro Tramway Company	10
Abram & Straus Company	20
Tiffany & Co.	21
Marshall Field & Co.	18
United Electric Light and Power Company	10
Motor Delivery Company	26
Gambrinus Brewing Company	12
Arnold, Constable Company	16
Peter Doelger Company	31
Swarzschild & Sulzberger	20
H. C. Pierce Company	43
Edison Phonograph Company	15
Jacob Ruppert Company	42
C. Schmidt & Sons	13
Edison Electric Illuminating Company	34
James A. Hearn & Son	36
Sulzberger Sons Company	19
New York Butchers' Dressed Beef Company	13
Anheuser Busch Company	57

The United States government has in use upward of seventy-five electric trucks.

It was after a searching investigation that the American Express Company recently placed orders for over eighty electric rigs—only a beginning.

Ninety-five per cent of all the commercial electric vehicles installed during the past eight years are successfully operating, while several installations show over fifteen years of actual service.

Large electric-vehicle and accessory factory extensions are now under way in many quarters. Could better endorsements be conceived?

The growing demand, it is safe to predict, will, within a few years, assume tremendous proportions, coming, as it will, from all the public-service corporations, from all branches of mercantile lines, including transportation companies and express companies, and for municipal use under the following departments: street cleaning and reomval of garbage, fire trucking and service wagons, police patrol and ambulance, hospital ambulances, and service wagons.

Michigan Law Favors Electric Owners

The secretary of state's office has discovered a joker, though probably an unintentional one, in the Smith-Bricker bill providing for a horsepower tax on automobiles, which was passed by the legislature and signed by Governor Ferris.

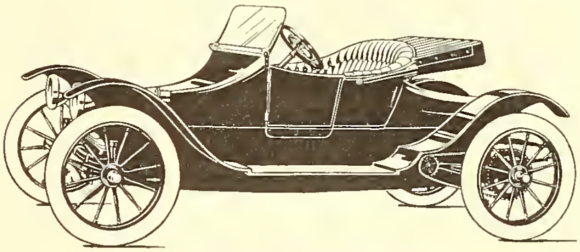
The bill fixes a tax of 50 cents per horsepower on automobiles in lieu of all other taxation, and in Section 1 prescribes the manner in which the horsepower of all cars shall be determined, "except electric and steam power vehicles, which shall be taken at the manufacturers' rating.

Here is where the joker comes in. The horsepower of electric cars is rarely given in the applications for licenses and where it is, it is usually placed at four or five. The manufacturers of electric autos do not rate their cars by horsepower, as the power of such a machine depends upon the condition of the storage batteries which furnish the motive power.

If electric machines are to be rated at four horsepower, for instance, the owner of a $4,000 car of this type will have to pay but $2 tax, which is just what a chauffeur who owns no car but works on a salary has to pay for his license.

The Model "F" Bailey Roadster

A new Bailey roadster known as "Model F," has been designed for those who wish a more luxuriously appointed car than its former roadster model. All of the mechanical and electrical characteristics of the first model have been retained in the new, the principal difference lying in body lines, greater seating and storage space, and in the front hood and wind shield. The specifications of the mechanical equipment will be found elsewhere in this magazine.



The Bailey Model "F."

Detroit's latest acquisition in the automobile business is the Electric Automobile Company, No. 1221-29 Woodward avenue, represented by Edmund Land, president, and R. B. Watson, secretary and general manager. The new firm claims the trade slogan, "How to Save $1,000," and will offer the Standard electric car, which is manufactured at Jackson, Mich.

Personal Items from the Field

William C. Little, well and widely known through his connection with the sale of both electric and gasoline cars, is now sales agent for the Borland-Grannis Company of Chicago. Mr. Little has the personal acquaintance of a large number of car dealers throughout the United States, having visited practically every section of the country as special representative of one of the large manufacturers of electric cars. Mr. Little comes to his new office from the Lozier Motor Company of Detroit, with which concern he was special representative in the sales department. In Mr. Little the Borland-Grannis people have secured an exceptionally good representative. Previous to his affiliation with the Lozier company, Mr. Little was connected with another manufacturer of electrical vehicles, and through his successful operations in the interests of this manufacturer, obtained great publicity for himself and the car he represented. "Bill Little" is what this popular salesman is called by the many who know him personally in this and other cities.

Walter E. Holland has been appointed manager of the mechanical and electrical research department of the Anderson Electric Car Company. Mr. Holland brings to this responsible position the expert knowledge resulting from valuable experience as an electrical engineer. As early as 1902 Mr. Holland was connected with the Edison companies and aided in the development of the first types of the Edison batteries, which had to do with tests of lead acid batteries and road tests of various types of electric vehicles. Many important discoveries in connection with storage batteries, and a number of improvements in them, are to the credit of Mr. Holland.

Stevens & Hartman have the agency for the Woods Electric in Freeport, Ill.

E. P. McDonald created a sensation for the pedestrians on Michigan avenue and the guests of the Blackstone Hotel in Chicago recently by suddenly leaving the throng of vehicles in the thoroughfare and bumping up the steps of the equestrian statue of General John A. Logan on the lake front in a Detroit Electric coupe. The car mounted the steep incline, 35 feet high, and descended in safety. McDonald, a salesman for the car, was demonstrating its capabilities for Miss Rita T. Stanwood, a young actress, who wants the car for a hilly country and desired to be shown its ability as a hill climber.

A. E. Archer has accepted a position as manager of the Ohio Electric Sales Company, 5025-27 Delmar avenue, St. Louis, Mo. Mr. Archer is a thoroughly experienced electric man, having spent over seven years handling electrics. He was formerly with the Columbus Buggy Company in Minneapolis. It is his plan to have a service department that is thoroughly competent to take care of the Ohio electrics that are now used in St. Louis, and also the cars of future owners. F. H. Roys will continue with this company in the sales department.

W. Reese Parker is to be new manager for the Anderson Electric Company's Minneapolis branch. He has been with the company since it began building electrics eight years ago, thus acquiring familiarity with the machine and all its parts, as well as with the policy of the company. He acted as manager at Philadelphia and other places.

E. W. Grinnell of the Grinnell Electric Company has taken charge of the electric motor vehicle department at Detroit, Mich., just organized by the company, which will add commercial cars to its line.

Harry D. Haupt, local manager, is issuing emphatic denial of rumors to the effect that the manufacture of Hupp-Yeats electrics has been or will be discontinued. According to Haupt, no such plan has been considered, the Detroit plant not having let up for one minute in the building of these cars. For the present, salesrooms will be continued at 2122 Euclid avenue, Cleveland, O., but new local quarters are planned for later. With Haupt is now associated R. M. Booth, former Hupp-Yeats distributor at Cincinnati.

Harry P. Young, first assistant electrical engineer at the Anderson Electric Company's factory, and regarded as responsible to a high degree for the electrical efficiency of the Detroit, is to have charge of a new move by the company in behalf of the automobile interests of Minneapolis. This is a system of free inspection and service and perfection of the organization for benefit of Minneapolis owners. "In early days," Mr. Parker said, "a service department meant severe trouble. With the Detroit electric system, it means the anticipation and avoidance of trouble."

H. Ward Leonard of Bronxville, N. Y., is the holder of patent number 1,042,698, that of an electrically propelled vehicle. By means of a gasoline engine he develops upon the vehicle itself the power making for the propulsion of the vehicle. Through dynamos this power is transformed into electric energy, the energy supplied to propelling motors at a degree of voltage and current as to give the vehicle the speed desired. The invention also allows of the vehicle's being held stationary on either an up or down grade, and without brakes.

F. W. Aldrich is a member of the automobile firm of Aldrich & Correll of Bloomington, Ill. They will handle the Ohio Electric in the district of McLean.

J. A. Kellam, assistant sales manager of the Ohio Electric Car Company of Toledo, closed with the E. I. Rumsey Garage, with show rooms at 21 Selden avenue, just off Woodward, Detroit, for the opening of a Detroit, Ohio, agency. The Ohio Electric Car Company has just completed arrangements for an addition to its plant, to be constructed immediately, which will practically double its factory space and enable it to double its output. Contracts for the current year, however, have already eaten up nearly all of this increased production and plans are now being drawn for another addition to the factory on the same scale.

R. W. Leach, who has been manager of the Woods Electric Vehicle Company's St. Louis branch house, at 439 North Euclid avenue, has accepted a position with the Rauch & Lange Electric Company, from which company he came to St. Louis with the Woods company about one year ago. Since then he has done much to establish a high reputation for "Woods' service" there. It is hinted that he may remain in St. Louis as one of the Rauch & Lange representatives.

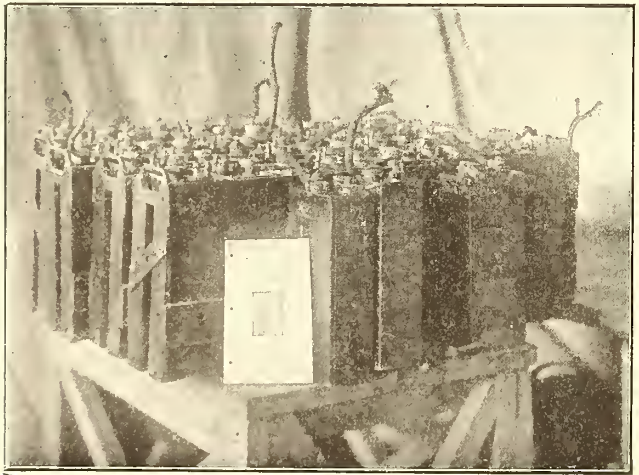
James J. Flynn, who has been identified with the automobile business of Washington, D. C., for nearly ten years, has been appointed eastern sales manager of the Standard Electric Car Company, and will have headquarters in Washington with W. P. Barnhart & Company, agents for the Standard electric. Mr. Flynn has a host of friends in Washington who wish him much success in his new field.

G. N. Jordan, Los Angeles branch manager of the R. C. H. and Hupp-Yeats electric, took one of the first orders ever given via wireless to an automobile salesman. The order came from C. E. Hansen, a Los Angeles capitalist, who was aboard the steamer Mauretania, returning from Europe, where he had been traveling with his wife. It was received by Jordan while he was experimenting in his wireless room at his home, being relayed to him by the Los Angeles wireless operator. Mr. Hansen had been visiting Europe with his wife, and while on the way home on the Mauretania decided to present his wife, who remained behind in England for a few weeks, with a Hupp-Yeats.

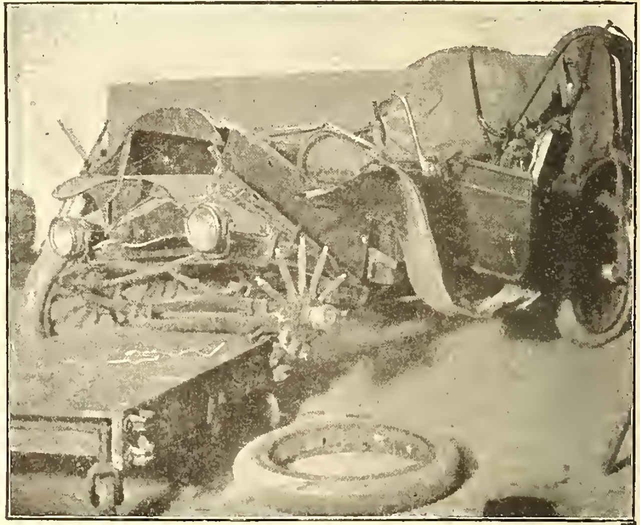
W. R. Jenney, two years salesman with the Minneapolis branch of the Anderson Electric Car Company, handling the Detroit electric, has been made sales manager in Indiana and Ohio, with headquarters at Chicago. After September 1 he will have charge of sales in California. Mr. Jenney's efforts are credited to a great extent with the large sale of Detroits in Minneapolis. He sold seventy-five to leading citizens. Although pleased with his promotion, Mr. Jenney said he regrets leaving Minneapolis and friends there.

Charles C. Fagan has received the appointment of sales manager of the Electric Sales Company, 1716 Broadway, Seattle, Wash. He is an experienced salesman, having served with the Mitchell and Buick agencies there. Mr. Fagan intends to make an aggressive fight for the electric commercial vehicles which the company handles.

IF A CYCLONE CAN'T DO IT—WHAT CAN?



Metal Hood was crushed in and battery short-circuited, burning off "jumpers." All cells O. K. on individual test.



Edison Storage Battery buried in car under tons of brick and debris—Omaha, March 23, 1913

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BULLETIN No. 1015 TELLS WHY A CYCLONE CAN'T HURT THE EDISON—GET IT.

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ELECTRIC VEHICLES

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Volume III **CHICAGO, JUNE, 1913** **Number 6**

The Law and the Automobile

The Responsibilities of the Owner for Its Use by Others Members of His Family

BY WALTER K. TOWERS

C. R. STOWE was county clerk of Christian county and possessed of a family and an automobile. The car was kept by the father for the comfort and pleasure of the entire family. Son and daughter had the right to use the car as often as they liked. The father knew how to drive the car but the son generally managed it. As the spirit moved him Robert Stowe, the son, took his sister riding, and often he took his mother with him. The machine was used by the family for the pleasure of the family. Robert operated the car with his father's permission and had the authority to use it when he wanted to, and the daughter had a like right.

Robert Stowe, who was eighteen years of age, was a deputy in his father's office. Arriving at the office one day and finding nothing to do he left without seeing his father. In fact he had not seen him that morning as he did not arise for breakfast. He went for the automobile of his own volition and at his own suggestion took his sister and other young ladies out for a ride. An accident resulted in injury to one Morris, who sued the father.

Now it is a general rule of law that a father is not "liable for the torts of his son committed without his knowledge or authority, express or implied." If a child under age commits a wrong injuring another while not acting under a parent's authority or control the parent is not legally liable in damages to the injured party.

But in the case stated above the Kentucky court ruled that the father was liable and required that he pay the damages. It recognized the general rule, but took the view that when a father purchases a car for the use of the family and the son is authorized to drive it for the family's pleasure, the son becomes the agent or servant of the father in driving the car and the father is responsible for the results of his negligence while so engaged. The element of service to the father here seemed to be in the boy taking his sister riding.

This case may be an unfortunate example as far as conveying an impression of the general rule of law is concerned, but when compared with other cases it shows the confusion that exists in the law in fixing the liability for such accidents. The automobile is a newcomer. Children very generally drive the father's car and cases of the responsibility of the father are continually arising. A child being liable for his own torts may, of course, always be sued. But generally the child has no property and so damages cannot be collected. Thus it is that the effort is usually made to reach the father.

The case stated above goes a long way from the general rule and most courts would probably hold that the son was operating the car for his own purposes outside his father's authority and control and that the father had no liability for accidents resulting. Many case of this kind have come before the courts. The situation usually is that the father owns a car that the son has general authority to operate whenever he wishes for his own pleasure or pur-

May Hotely, Lubin Motion Picture Actress, in Her Baker Electric.

poses. When the son takes the car out for some purpose of his own and negligently injures another the father is generally held to have no legal responsibility in the matter and recourse must be had against the son alone.

Mr. Buck was a dealer in agricultural implements, buggies and automobiles in Davenport, Iowa. He decorated an electric automobile belonging to him for use in a parade, in which it was driven by his daughter. After the parade the machine was left standing in front of the father's store. The son, Emil Buck, had for some time been employed in his father's store but had been granted a holiday. He decorated a steam machine, and with a party of friends, drove it about town without event, returning it to his father's premises. He went away for a time and in the meantime the daughter returned and left the electric on the street in front of the store. Buck directed an employe to take it in and soon after left the store. Soon after the son returned and seeing the machine standing there invited a young lady friend to ride home in it. He took her home by the nearest route and on the way back Reynold's horse became frightened at the machine and an accident and injury resulted.

This court held that even if the son was negligent the father could not be held responsible. It took the view that the son was using the machine solely for his own pleasure and convenience and that it was in no sense connected with his employment or with his father's business. The son was not acting for his father and so the father was not liable.

Daughters, of course, are in the same category as sons. Many cases have decided that where a daughter has general use of a machine and, using it solely for her own purposes, negligently causes an injury she alone is liable, the parent having no legal responsibility.

There is a general rule of law that a father who allows a child to go about with any dangerous agency is liable for resulting injury. When automobiles were a novelty persons injured by machines driven by children sought to fasten liability on the parent by claiming that they were a dangerous article and a parent who allowed a child to be abroad with one should take the consequences. But the courts, generally, refused to incline to this view.

"The automobile is not a dangerous device," says one judge. "It is an ordinary vehicle of pleasure and business. It is no more dangerous than a team of horses and a carriage; or a gun, or a sailboat, or a motor launch."

But if the child is in any way serving the parent in operating the machine the parent is liable as for the acts of a servant while engaged upon the master's business. The courts are generally very ready to hold a parent liable where possible, and if there is any evidence that the child acted upon the parent's suggestion, request or orders, was performing any errand or service for the parent, the parent will be held liable.

A Massachusetts case provides an excellent example of the father's liability. "In this case," said the judge in rendering the opinion that held the father liable, "a father had bought an automobile for the general use of his family. It was registered in his name, but the only member of his family licensed to operate it was his minor son, and the machine never was operated except by him. The defendant testified in substance that his wife had his permission to use the automobile whenever she desired, without making any special request for it, and that he expected his son to mind his mother if she asked him to take her out with the car. The plaintiff was injured by a collision with it under circumstances which warranted a finding that the son was negligent on an afternoon when he was driving the car with his mother at her request. These facts warranted the inference that the son was then acting in accordance with general instructions expressly or impliedly given by his father. The boy was not running it for any purpose of his own, but for the convenience of his mother and by her express direction, for whose use, in common with the rest of the family, it had been purchased by his father. If the father had employed a chauffeur outside the family at a stated compensation it could not be contended seriously that taking the wife out for an afternoon call was not the business for which he had been employed. If, instead of hiring a stranger, the father chose to have the same work performed by his minor son, to whose time and services he was entitled as a matter of law, it could be ruled as matter of law that a jury might not find the business to be that of the father. This is not a case of mere permissive use of the father's vehicle by the son for his own pleasure. Although the father had no knowledge of the particular journey which was taken on the occasion of the accident, his knowledge that on prior occasions the wife had used the car, and his testimony of the purpose for which it was bought, and that it was not customary when the wife was going on errands with the automobile to ask his permission, were enough to support a finding that the trip in question was authorized by him. The fact that the son was the only person in the family who could legally operate the car had some tendency in that direction. The relation of husband and wife is such that when the former has purchased an automobile for family use, a ride by the wife in it with his general permission is not as matter of law the business of the wife, but may be found to be that of the husband."

The controlling question is "For what purpose was the child operating the car?" If the child was running it for his own purposes the father should not be held liable; if for a family purpose for which the father was legitimately responsible or on his father's business then the father is liable.

A chauffeur is in much the position of a son as far as the owner's liability is concerned. Of course, as he is hired to run the car there is more likely to be evidence that he was about the master's business when an injury occurred and so the master is held liable. But if a chauffeur takes a machine without authorization, or even borrows it for his own pleasure and an accident results that chauffeur alone is generally held liable where he was not in any sense engaged in his master's business. Of course the chauffeur is engaged on his master's business just as truly while going on errands alone, going for the owner, or returning to the garage, or testing the car as though the master be actually present in the car. In either case the master is liable for his servant's acts.

In this branch of the law, as in all others, it must be remembered that the state legislature may, and frequently does, pass some special statute imposing a further or different liability on various classes, which may vary the general rules of law.

(Copyright, 1913, by Walter K. Towers.)

Work on the new brick garage, 1113 Commerce street, Fort Worth, Texas, to be occupied by the Detroit Electric and Motor Car Company, is steadily progressing and will be completed and taken possession of July 1, according to Buford Adams, secretary. The building is to cost $8,000.

The Growing Popularity of Electrics

Paper Read at the New England Electric Vehicle Convention

BY H. H. RICE

H. H. Rice of the Waverly Company.

THE popularity of electrics is a subject as close to the heart of many central station men—and should be to all—as it is to that of the manufacturer. It is in fact, a phase of their own intellectual growth as well as that of the general public. This may easily be judged by the rapid increase in charging stations and of suitable garage facilities in each of the larger cities. In this, as in many cases, the supply follows the demand; yet it has been shown that the supply of garage and service creates its own demand, and wherever you anticipate such demand for service you will in most cases find that the demand quickly follows. The encouraging feature of this growth of sentiment in favor of electrics is not limited to those who derive profit from them. The public itself acknowledges the desirable features of the electric car in ever increasing numbers. There are thousands of owners of automobiles, who, if they were to make their automobile investment over to conform with their present ideas, would find in their stable a place for an electric. They will do this eventually, as is shown by the large number of gas cars which are traded in for electrics and many more which are offered in trade.

As to the growth of the electric vehicle among central station men, it is now six years since the writer was asked to present before the National Electric Light Association what was, I think, the first paper of the kind urging upon central station people the necessity and advantage of pushing the electric vehicle. Since then, we sometimes feel that the tables have been turned, so many central station people are urging upon the manufacturer the pushing of his product and are so actively engaged themselves in booming the electric vehicle. It is certainly very gratifying to those of us who have stood by the electric all these years to observe this most positive indication of the growing popularity of the electric vehicle.

Another indication of this growing popularity is that the manufacturers and dealers in gasoline cars have changed their attitude of outright contempt or good natured tolerance to recognition that the electric, both in the passenger and truck vehicle, is a car which in its own field is unequalled by the gas car. Only a few years ago, the manufacturer of a gasoline car looked upon the electric as a toy or a car for the woman or the man who did not dare; but today they have been forced by figures of cost and maintenance to acknowledge that the electric cannot be ignored for service and that in spite of self-starters and all the other improvements the electric is par excellence the car of convenience for city use.

It hardly seems in place to argue for the "growing popularity of electric vehicles" to those who are entirely familiar with the fact, but sometimes we do not see best the things that are nearest to us, and when we hear of the tremendously large sale of gasoline vehicles we wonder if the electric is really growing as fast as its friends and well wishers would have us think. According to *The Automobile* there were in October, 1912, some 33,842 electric pleasure cars registered in the United States, while the new registration for the year was 5,550, showing a growth of 20 per cent. It is difficult to say how the editor of *The Automobile* arrived at these figures and it is quite possible that they fail to do justice to the actual situation. It is worthy of mention, however, that even these figures show that there are half as many electric vehicles in use in this country as there are automobiles of all types in France or any other of the leading countries of Europe. At present there is no accurate way of obtaining a definite report on the actual number manufactured except by a very tedious inspection of the registration records and from these, owing to the different laws of the various states as to making these entries it is quite difficult to obtain satisfactory information. However, one need only look about and count the large number of new firms manufacturing vehicles to know that at least from that source there are a great many electrics being placed on the market. Then, by noting the number of new vehicles of the older manufacturers which are seen on the streets, further proof is added of the increase. One has but to look about him in any city of the country, except in the East perhaps, to realize to what extent electric vehicles are used, and even in the East itself, people are beginning to take up the electric pleasure vehicle. For a number of years, indeed, certain sections of the East have shown a larger use of the electric commercial vehicle than anywhere else in the country.

It is generally considered in the automobile trade that the gasoline car and the electric occupy different fields and there should be no active competition between them. It is a fact, however, as we all recognize, that many owners of gasoline touring cars have become so accustomed to the use of their machines that they employ them without considering the cost in daily service, to and from business and in their pleasure rides in and about the cities in which they live. The general use of high priced touring cars for both city and country service is one of the most expensive and uneconomical fads of the day. It is much the same as if the carriage owner of fifty or one hundred years ago had insisted on driving a stage coach on city streets because it was necessary to use such a vehicle for long distance work on country roads.

The electric pleasure car as it is built in this country fills the place of the fashionable pleasure carriage as it was used before the introduction of the motor vehicle. It has all the speed allowed, or mileage necessary, within the city limits. It is built with greater luxury than the most fashionable carriages of the last generation and it has every advantage over the gasoline car for daily service. It is simpler in construction, free from all the mechanical troubles that beset the gas car and far more economical to maintain than any gas car. The man who has $4,500 to invest in automobiles will do well to consider whether he can find a better investment than a $3,000 electric for city use plus a $1,500 gas car for touring purposes.

It is now twenty-one years since the first electric vehicle was seen on the streets of Chicago, but it was five or six years after that that they began to be manufactured. If it were not for the phenomenal growth of the gasoline automobile during these later years, the increase in the use of the electric vehicle would itself be considered phenomenal. The growth of the business has never taken on boom proportions and hence has not been subject to the fluctuations that have affected the gasoline car industry. The increase in the demand for electrics has been sufficiently moderate to be a normal and healthy growth and it has never been stimulated by an extraordinary amount of free publicity. Yet the electric has done a very, very large amount of straight advertising in proportion to its business and the advertising done by the manufacturers has always been in advance of the volume of business. They spend a larger percentage of their gross business on advertising account than almost any gas car company.

It is accordingly not surprising this year, when many gas car factories are running on short time, to find the manufacturers of electrics working at full capacity and in some cases increasing their product over last year's business. Today there is no manufacturing industry in the United States that is more firmly established, more safely within the bounds of its legitimate field than the electric automobile business. As for the car itself it may well be claimed that while many improvements, small and great, may be looked for within the next few years as in the past, it is at this moment a highly developed, well-balanced piece of mechanism which runs with comparatively little attention.

What I have said about the general attitude of the public, the central station men and the gas car manufacturers as to the growth of the electric, applies both to pleasure and commercial vehicles; but I cannot help referring particularly to the steady growth of the electric truck and delivery wagon business, and the increasing importance of that side of the industry. The field of the electric pleasure carriage, as now built, is already pretty well defined and its future growth may be predicted with some degree of certainty. The field of the electric commercial wagon has hardly been explored as yet. There is an immense opportunity for the use and distribution of electric motor wagons which remains to be opened and exploited. It is the undiscovered country of the future and the growth of that branch of industry is likely to be one of the phenomenal developments of the next few years.

This growth of the electric commercial vehicle is all the more remarkable because the comparatively few manufacturers have had to make headway in face of the competition of a hundred manufacturers of gasoline trucks. Nearly every manufacturer of gasoline pleasure vehicles puts a commercial body on his chassis and thus has an outlet for his surplus stock of obsolete styles. He can make a demonstration on pneumatic tires, which will of course be excellent in speed and in performance, but day in and day out and year in and year out the electric invariably shows the lower cost per package. People who do not know this fact themselves are hard to convince when one salesman is making this claim and a dozen salesmen are shouting the features of the gas car, and it is for this reason that this association and its branches are forming and are doing such excellent work.

One could hardly speak of the growing popularity of the electric vehicle without paying tribute to the work of many of the central stations.

Let us continue persistently to claim for the electric the advantages which it so surely possesses, be careful not to claim superiority in fields where it is not as yet superior, and show by our deeds as well as our words that we believe everything we claim.

Electric Makes Hard Run

"After my recent trip to San Francisco and return in a Baker electric, I felt that there was scarcely any place in the Sacramento Valley which was impossible for an electric," says Charles Graham of the Baker Electric Company. "In order to prove my theory I selected a trip that was surely a test for any car—a trip across the Yolo basin. This meant a long distance through the deep sands on the levee and then through the mire which has been found impassable by many automobiles.

"I had never been through to Woodland before, and to attempt to learn the road by instruction is impossible. It extends for many miles through private property and there were many gates to open and close on the way. In some places the property owners showed some displeasure at having trespassers on their property.

"The conditions of the roads under these circumstances may be better imagined than described. My little car, however, never hestitated and I am sure that when I arrived in Woodland I had made the trip as easily as any car has gone through this year. At no time was the car in difficulty either in the deep sand on the river levee or in the mud of the tule land. I passed several fresh evidences of where autos had been stalled, but I went through to Woodland without assistance. The twenty-two miles required one and a half hours which is good time considering the roads. A little later in the summer the roads will be better and this should make a nice trip.

"There is a charging station at Woodland, but I kept right on to Dixon, twenty-four miles further, without recharging.

"At Dixon I stopped two hours and a half for recharge. I continued on to Vacaville over fine country roads, arriving there early in the evening. My llittle car was the first electric to be seen there and you may be sure it was an object of some curiosity.

"There is no charging station at Vacaville, but one will be installed there shortly. I stayed there overnight, returning to Dixon in the morning. I left the car on charge for a short while there and again at Woodland, thence to Sacramento."

A foreign municipal engineer is now testing an American electric-motor truck imported by a local firm, in handling city refuse. An American consul reports that the test will last about a month, and if it proves successful the engineer will recommend the purchase of half a dozen trucks of different makes to compare with the efficiency of each, after which it is possible that about 25 of the make decided upon as the best for the local needs will be purchased.

Central Station Service for Owners

Paper Read at the New England Electric Vehicle Convention

BY L. R. WALLIS

IN THE majority of cases the purchaser of his first electric of either type knows comparatively little about those essentials of operating, maintenance, care and charging, which it is necessary for him to understand in order to insure the successful operation and satisfactory performance of his battery driven machine. It therefore devolves upon some interested party to provide the information and render the service required for its intelligent installation and operation. The logical agencies for the undertaking of this work are the manufacturer or his representatives, the central station and the owner.

It devolves upon some interested party to provide the information required for the intelligent operation of an electric motor car. The interest and responsibilities of manufacturer and central station are closely allied and it becomes difficult to differentiate between the character of service that each should render. It would appear to be equitable to make the division on the basis of that portion of equipment supplied by each. The manufacturer's agent should advise the central station of the details of his sales. The central station should then be able to recommend the best charging apparatus. The central station can further assist by educating the public to the advantages of the electric through advertising and publicity and by maintaining a department of vehicle and battery engineering. It is also the province of the central station either to establish public charging stations or to use its influence in inducing others to open electric garages.

We will assume that the owner is willing to use what knowledge and facilities he may possess for the most efficient handling of his property, but he may rightfully look to the manufacturers from whom he purchases his car and equipment and the central station which supplies him with electric current for charging to co-operate in providing such service as is necessary to assist him in making his electric a success.

From an electric motor car standpoint the interests and responsibilities of the manufacturer and central station are very closely allied and it becomes difficult to differentiate between the character of service that each should render as in many instances each interest stands ready to offer the electric car user service along practically the same line. Geographical and financial conditions often become instrumental in determining just where the line of responsibility should be drawn.

In the large cities where the manufacturers are ably represented and a strong central station company exists, the question of service should be of such a character that the methods employed would not need discussion as each interest will doubtless be willing to offer the user practically the same assistance. In smaller cities and towns where the central stations are not in a position to engage actively in promoting the electric vehicle, if the field is considered a promising one, the manufacturer should assume the larger part of the burden until the business grows to such an extent that the central station will be automatically forced into it, while in such territories as are remote from the factories and lack adequate factory representation, the central station should strain a point to foster the industry during the introductory period, after which the volume of business will warrant the manufacturers in establishing sales, agencies and maintenance departments in those sections.

In any event there should be a tacit understanding between the manufacturer and central station as to what part of the service each is willing to assume and a compromise agreed upon covering such details not previously arranged for, so that the efficiency of the service will not suffer.

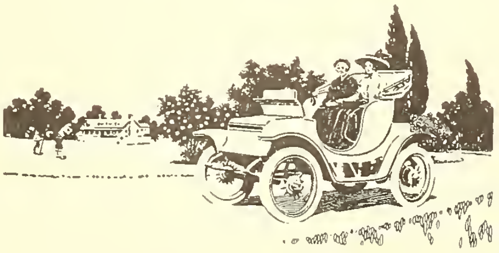
If a distinct line were to be drawn between the service to be rendered by the manufacturer and the central station it would appear to be equitable to make the division on the basis of instruction and supervision of that portion of the equipment supplied by each. According to this rule the manufacturer would advise as to the size and type of the machine to be purchased, the battery and motor equipment and other details necessary for the satisfactory performance of the work required, while the central station, if sufficiently informed, might properly act in an advisory capacity to approve the recommendations of the agent. The manufacturer should also have charge of the maintenance of the machines after they have entered service and direct the manner in which they should be charged and cared for.

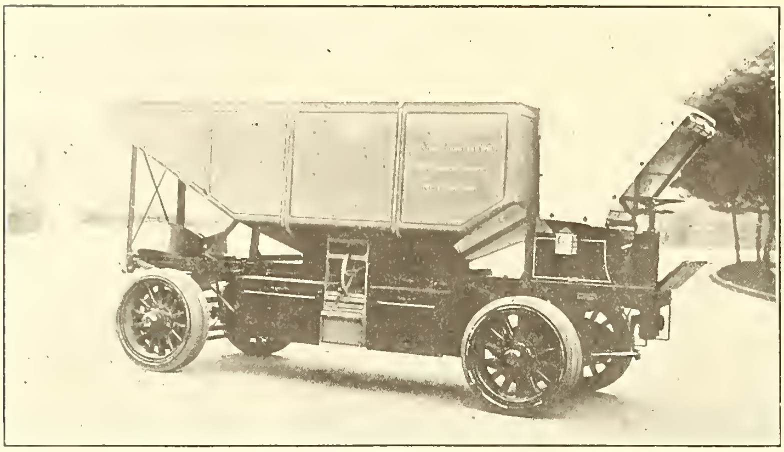
The central station should deal with the customer in matters relative to the supply of charging current, the rate at which it is sold, the proper charging apparatus to be installed and act in the capacity of a consulting engineer in case the operation of the electric should be unsatisfactory, or the cost of such operation should prove excessive.

In justice to the user, however, in each case it should be clearly understood what portion of the service is gratuitous and what is to be charged for.

To be a bit more specific, the selling agent of the manufacturer should seek out the prospect, bestow upon him the necessary time and attention and provide him with full information concerning his product; he should study his conditions and requirements in order to convince first himself and then the prospect whether or not the electric will satisfactorily perform the service required. If the results of the investigation are favorable to the electric he should put forward his best efforts to effect a sale. The central station should then be notified of the sale with full information as to name, address, type of machine, size of battery, etc. This is important in order that the central station may study the situation from its standpoint and be ready with service by the time the car arrives.

On the arrival of the car the manufacturers' agent should instruct the owner or his driver to a full understanding of its construction, the most effective and efficient operation of the machine,





Seven Ton Borland Coal Truck.

the care necessary for its most successful performance and familiarize him with the care and charging of the battery necessary for its maximum life and mileage. He should provide regular inspections and arrange for speedy delivery of repair and renewal parts in case of necessity.

The central station on being advised of the sale of a car should at once get in touch with the purchaser for the purpose of learning his requirements and advise the best methods of caring for and charging his car either at a public garage or his own charging station. In case of the latter the lines should be run and the service installed. The central station should be in a position to recommend the best charging apparatus for his specific need and render assistance if desired in procuring and installing it in the customer's premises. The electric company should also provide instruction in the best methods of using such apparatus and the most economical manner of using the current. Regular inspection of the electrical apparatus should also be made to insure constant service, safety and satisfactory performance.

The central station should establish a rate for charging current which, while profitable to itself, should be low enough to meet the requirements of battery charging, realizing that this branch of its business requires service during the period of its valley load.

Although the foregoing may be considered a legitimate division of responsibility between the manufacturer and central station, it is self-evident that the line should not be drawn too rigidly, as in many instances the two interests can work conjointly not only for the increase of sales but for the betterment of the service and the greater satisfaction of the user.

Co-operation is the keynote of success in the electric vehicle as well as in every other business, and where the various agencies work in harmony, there the best results will be obtained.

The central station can well afford, through advertising and publicity, to educate the minds of the public along the lines of the superiority and advantages of the electric and thus augment the increased sales of the agent and he in turn can easily increase the business of the central station by friendly advice to the purchaser and wisely designed sales.

The central station can render valuable service to the manufacturer as well as the user by maintaining a department of vehicle and battery engineering, whether it consists of one or more individuals whose function it is to bring the prospect and agent together for their mutual benefit and to safeguard the interests of each after the sale has become consummated.

Service after the sale is of the utmost importance by whomever rendered and is the secret of the repeat order.

Another important feature of service which should be undertaken by the central station is the purchase and use of electric vehicles of both types, in its own transportation, to an extent warranted by the size of the company and character of its business. In this manner only can the central station obtain the data necessary to foster intelligently the interests of its customer. The moral effect of putting into practice the advice given to prospects cannot be thoughtlessly ignored.

It is the province of the central station either to establish public charging stations under its own auspices or use its influence to induce others in its territory to open electric garages or add electric charging apparatus in an already established garage. The majority of the owners of passenger electrics and fleets of commercial electrics will desire to support their own charging facilities, but it is essential that public charging stations be available to provide boosts and render maintenance service whenever they are called upon to do so.

As a step in the right direction in anticipation of a more satisfactory arrangement, facilities should be arranged at the main power station where electrics may be charged at any time during the whole of the twenty-four hours.

The subject of a public electric garage is one of the utmost importance during the introductory period of the electric vehicle, for without such an institution the agent finds it very difficult to interest his prospects, and even if a sale is made the owner passes through a very discouraging period of experimentation on account of the superficial knowledge possessed by those directly in charge of the machine.

In an increasing number of instances central stations have deemed it expedient to maintain public electric garages either in connection with their own fleets or under independent management at another location where owners may receive expert care and advice and where they may feel free to come in cases of unsatisfactory performance and unknown difficulties. There are few central stations of moderate size who cannot provide some such an arrangement and it will be found that the agents will center their efforts on the territories which have been made possible in this manner.

Whatever else the manufacturers may demand of the central stations they certainly have the right to expect a friendly attitude, cooperation and a warm welcome in the territory served by them.

There will probably be a wide difference of opinion as to the natural division of responsibility between the manufacturer and central station, but we must not lose sight of the fact that the two interests are in partnership for the purpose of supplying the maximum of service to the user with the minimum amount of friction between themselves.

Service must be rendered; by whom the user is but slightly concerned, and if each factor in the business is willing to do just a little more than he considers his share no one need have any misgivings as to the future of the electric vehicle.

The Electric Vehicle Convention at Boston

The Manufacturers and the Central Stations Get Together

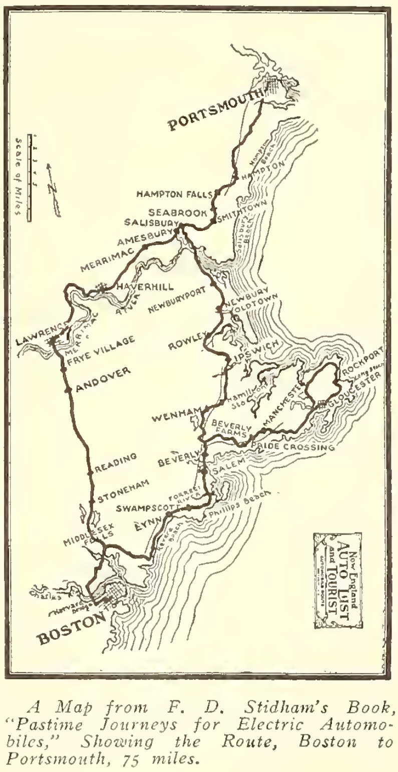
BY ALLEN L. HAASE

PREPARATIONS made by the Electric Motor Car Club of Boston, Mass., and the Boston section of the Electric Vehicle Association of America, for holding a convention May 20-21, with headquarters at the Engineers' Club, were elaborate and detailed. The purpose cited for the holding of the Boston convention was to show the progress made lately in New England in electric vehicle world and to further co-operation between those interested in the forwarding of the electric motor-car campaign.

E. S. Mansfield, of the Boston Edison Company, was chairman of the convention committee and at a meeting of the club held on May 1, announced the following papers to be read at the convention:

"The Growing Popularity of the Electric Vehicle," by H. H. Rice; "Opportunities in the New England Field for Electric Vehicle Development," by F. M. Kimball; "How the Central Station Can Increase Its Electric Vehicle Load," by W. C. Anderson; "Constructive Criticisms," by E. R. Davenport; "The Proper Selling of Electric Cars," by Louis E. Burr; "What Service Should the Central Station Furnish Owners of Electric Cars?" by L. R. Wallis; "Advertising the Electric Vehicle from the Manufacturer's Standpoint," by F. N. Carle, and "The Electric Vehicle as an Advertising Proposition from the Central-Station Standpoint," by E. W. J. Proffitt.

The entertainment committee arranged an outing for one of the two afternoons and a visit to one or more industrial plants where the production of electric automobile and truck equipment is carried on. One of the features arranged for the convention was a display of Boston's electric vehicles doing active duty. The owners of these cars were asked to drive through a designated square during certain hours, so that the popularity of the electric car in the hub city could be estimated.



A Map from F. D. Stidham's Book, "Pastime Journeys for Electric Automobiles," Showing the Route, Boston to Portsmouth, 75 miles.

At the pre-convention meeting, the twice-a-month publication of a club bulletin to keep the members posted as to membership additions, changing of charging stations, forth-coming meetings and other such general information to electric vehicle men, was announced as a surety and to have an early presentation to the club.

Another pamphlet, to be known as "Pastime Journeys for the Electric Automobile," was declared by F. D. Stidham to be well on its way toward an early distribution. This pamphlet will appeal to the owners and prospective owners of cars along different lines from those adhered to by the regular automobile catalogue. The new publication describes in narrative form various trips from Boston as a center to historic places and spots of natural beauty in eastern New England, giving full details as to mileages, charging points, road characteristics, turns, routes, boosting points and all necessary information to facilitate covering the best parts of the country within a radius of 300 miles from Boston by every prominent make of electric vehicle now built. The booklet also includes articles explaining the noteworthy features of the electric machine, the purposes of the Electric Motor Car Club and general information.

It is worthy of comment that all the papers announced were actually prepared—which is not always the case at conventions—and will be published in ELECTRIC VEHICLES. A number of them appear in this issue.

At the meeting were present representatives of several of the leading makers of electric pleasure cars and trucks, and managers of electric light companies in all parts of the New England states, the attendance numbering about one hundred. The advertising manager of ELECTRIC VEHICLES pulled down the record for coming the longest distance to attend the convention. President Fred M. Kimball of the New England Section, Electric Vehicle Association of America presided, except while he read his excellent paper on "New England as an Electric Vehicle Field," which will appear in the July number of ELECTRIC VEHICLES. During this time the chair was occupied by E. S. Mansfield.

Mr. Kimball's remarks on the history of the electric vehicle precipitated an interesting discussion. L. A. Tirrell of the Commercial Truck Company placed the average annual renewal cost of an electric vehicle at ten per cent. Col. E. W. M. Bailey of S. R. Bailey and Company called attention to the fact that there are still in active service some cars built fifteen or twenty years ago. Harry Robinson of the New York Edison Company, secretary of the Electric Vehicle Association of America, mentioned that his company is still using a car built in 1901. P. E. Whiting of S. R. Bailey and Company, explained that the whole of New England is now easily toured in an electric because of the frequency of charging stations. Further discussion, prompted by a question asked by F. D. Stidham of the New England Auto List, author of "Pastime Journeys for Electric Automobiles," disclosed the fact that electrics whose maximum speed on level roads is 26 miles an hour make an average of 27¼ to 30 miles an hour on roads containing grades.

The paper on the "Growing Popularity of Electrics" by H. H. Rice of the Waverly Company was read by F. S. Rogers, New England representative of that company. The paper is printed on another page. Discussion was started by E. S. Mansfield, who observed that the present growth of electric popularity is more noticeable in the East than in the West on account of the earlier western development. The distance of electric manufacturers from New England was held accountable for the slow development of that territory by Frank J. Stone of the Electric Storage Battery Company, who thought facilities for garaging and charging should be improved. J. H. Hunnewell, of the Lowell (Mass.) Electric Light Corporation, announced the completion of a twenty-car garage by his company, and noted an increase in his city.

"Central Station Service for Owners of Electric Cars" was a paper by L. R. Wallis of the Edison Electric Illuminating Company of Boston, which is reproduced elsewhere. . In starting its discussion F. W. Rollins of the Worcester Electric Light Company, said that in spite of there being some 75 pleasure cars and trucks in his city, his company had obtained little co-operation from the manufacturers. P. E. Whiting thought central stations should act as boosters for the whole industry and should not take agencies for certain cars, but he said it was difficult to persuade gasoline car agents to include electrics. F. E. Sawyer of the Salem Electric Lighting Company promised the co-operation of his company to any agent. The company has a 10-car garage and is pushing the electric. He thought manufacturers should provide more demonstrators and cars, and not try to cover all of New England from Boston. Frank J. Stone advocated appointing agents among the gasoline car dealers. P. E. Whiting thought a good Boston agent better than an irresponsible local agent.

The central station and the electric sales organizations should join hands, in the opinion of Col. Bailey. The Hartford Electric Light Company, said its representative, Mr. Thayer, is agent for a truck but boosts all pleasure cars impractically. D. C. Tiffany stated that his company had tried to arouse lighting companies to co-operate in securing agents, but with little success. The real need is improved service, according to Eugene Carpenter of the Martha's Vineyard and Nantucket Electric Light Company. Distinctive garage and charging station signs, inexpensive private charging sets, uniform rates, and an Electric Vehicle Association demonstrating bureau were among his recommendations. Secretary Harvey Robinson of the E. V. A. announced the completion of a design for signs for garages and charging stations.

The New Bedford Lighting Company serves one garage at a five-cent rate, and the garage charges 15 cents, according to Mr. Beals. His company proposes to serve customers direct at off-peak hours for 3½ cents. The Salem Electric Light Company, by S. F. Smith, the Worcester Company by Mr. Rollins and a number of other central stations agreed to advertise electric vehicles in their communities, as the Naragansett Company is already doing at Providence.

The Public Service Company of New Jersey employs men to advise new or prospective customers, attend to charging facilities, inspect cars free and report to manufacturers. This system, said J. C. Bartlett of Philadelphia, should be adopted in New England. Boston offices cannot cover all New England without assistance from the central stations, on which the district agents must depend for service, said Albert Weatherby of the Anderson Electric Car Company. S. Fred Smith, of the Salem Electric Light Company said his company not only had housed all the electrics in its city, but had sometimes given free garaging for a year.

The Boston Edison Company, announced E. S. Mansfield, gives free monthly inspection service to owners. Circulars are to be prepared by the New England Section of the E. V. A. and provided to central stations at cost for local distribution. L. R. Wallis closed the discussion by endorsing Eugene Carpenter's suggestions and proposing that manufacturers contribute to an inspection bureau on the basis of their sales, central stations also contributing except when they maintained such a bureau themselves.

The first paper of the evening session was "Constructive Criticism" by E. R. Davenport of the Narragansett Company. "How a Central Station Can Develop Its Electric Vehicle Load," by W. C. Anderson of the Anderson Electric Car Company followed. The papers were discussed together. Converse D. Marsh of New York defended the present price of electrics and the use of fine catalogs on the ground that certain parts of the electric (axles, for example,) are more expensive than in gas cars, and the appeal to women buyers requires a high grade of literature. Col. Bailey extended the remarks on the higher cost of manufacture of the better electrics. Frank J. Stone thought that prices would be reduced naturally as sales increased, and urged that other central stations emulate the Boston Edison in spending development money on the electric. J. H. Hunnewell of the Lowell Electric Light Corporation said his company was sponsor for all cars in its territory, and claimed that maintenance and depreciation, and not first cost and charging cost, are the determining factors in the sale of electric trucks. That a good, serviceable electric pleasure car could be made to sell for $1,250 was doubted by William Bee of the Edison Storage Battery Company. Col. Bailey mentioned the excessive rate of 25 cents a kilowatt-hour as being charged in some places, and urged central station men to study this phase of the question.

The evening session closed with Louis E. Burr's paper on "Proper Selling of Electric Cars."

Wednesday morning the convention adopted resolutions opposing the taxation of trucks at the rate of five dollars per ton capacity, as provided in a bill before the Massachusetts legislature. Then followed two papers; one by F. Nelson Carle of New York on "Advertising the Electric Vehicle, from the Manufacturer's Standpoint," the other by E. J. W. Proffitt of Providence on "Advertising the Electric Vehicle from the Central Station Standpoint." In the discussion J. C. Bartlett of Philadelphia contended that the electric is essentially a de luxe proposition, and that economy is a secondary consideration. Advertising, he said, should appeal to love of ease, pleasure and "snobbishness," and he advocated a pooling plan of advertising. The Philadelphia Electric Light Company gives some of its newspaper space to the vehicle business occasionally, but does not join with manufacturers in advertising cars. Six cents per kilowatt-hour is charged in Philadelphia, and the company's income from this source averages about eight dollars per month per car.

Conditions in the South were interestingly described by H. W. Hillman of the General Vehicle Company, who recently returned from that quarter. The principal cities, he said, already have good garages and all are ready to adopt electrics. About eighty trucks are in use in Baltimore, and the service is excellent. Central station income from sale of charging current, he claimed, is about 30 per cent greater than from cooking and heating supply, because of the latter's high demand. Business in Boston has been stimulated by the express companies' use of trucks, according to Day Baker, of the General Vehicle Company. He asserted that both pleasure cars and trucks gave the greatest satisfaction in cities such as Salem, Lowell, Worcester, Hartford and New Bedford, where active co-operation existed between the central stations and the vehicle men. W. C. Anderson of Detroit offered to devote funds to central stations for the care and repair of cars in cases where it was impracticable to send a man from the vehicle company's offices.

At 1:50 P. M. special cars left the corner of Hanover and Portland streets for Bass Point, Nahant, on the north shore of Massachusetts Bay. There, at the Relay House, the visitors enjoyed an old fashioned outing, with a program of baseball, foot races, obstacle races and other events, with bowling and billiards as a side issue for those who wanted them. A visit was made to the works of the General Electric Company at West Lynn and the manufacture of motors and other vehicle parts viewed from the inside. In the evening a Bass Point dinner was undertaken successfully, at which the main discussion was concerned with clams, fish, lobster and the like, with incidentally a short business meeting and a few one-minute talks on convention topics.

Portland's New Garage Opened

A step forward in the progress of the electric vehicle in Portland, Ore., has been marked with the opening of a handsome new structure, the home from now onwards of the Gibson Storage Battery Company and the Gibson Electric Garage. This is the first garage built exclusively for electrics in the Northwest, and the building ranks with the finest in the country in point of equipment, location and general finish.

The building, just completed, is located on the southeast corner of Alder and Twelfth streets. It represents an investment of approximately $27,000, exclusive of the company's equipment. It is said to be the largest garage without a post in the city, being 60x100 feet. The office will occupy a space of 20x40 feet.

In this handsome new structure only electric cars are stored, and a portion devoted to the charging and storage of commercial electric vehicles. The chug chug wagon has no place here. It is an electric house in practice as well as theory, and only the clean, silent cars will be allowed to enter.

At the head of this enterprise is the man who sold the first electric automobile bought in Portland. He is F. C. Gibson, until recently president of the Gibson Storage Battery Company. Mr. Gibson has been identified with the electrical business for more than 17 years and for a large part of that time he has been in the automobile branch running his own business.

Associated with Mr. Gibson is A. E. ("Dad") Foss. Mr. Foss needs no introduction to the motorists of Oregon, or the automobile trade of the United States. His name is synonymous with the inception of the self-propelled road vehicle. His experience in the motor-car field dates back to the time when the automobile was a curiosity, when a drive down the main thoroughfare of any town was the signal for the appearance of the whole population.

"Dad," as he is familiarly called by habitues of "the row," came to Portland as superintendent of the Studebaker Corporation's factory branch. Prior to that time he had been connected with the Seattle house of the same firm. Among other notable things, Mr. Foss helped to build the first Peerless car manufactured. There is no man in the automobile business in the Northwest who enjoys a wider acquaintance in this territory than "Dad," and he numbers among his friends the leading lights in the automobile manufacturing field.

Ever since he has been in business here, Mr. Gibson has confined his operations to Alder street. In seeking a location he retained his faith in that thoroughfare. He thinks it is the most desirable street in the city for a garage, especially the kind he has opened. The fact that he is "right around the corner" from one of the leading theaters and that no street cars pass his door appeals to Gibson as important benefits.

The equipment installed for the care of electric cars is elaborate. More than $2,000 was spent in adding equipment to the extensive investment that he already had. For the charging of cars he uses direct current, doing away with rectifiers.

With the opening of this establishment came another electric car. Mr. Gibson now has the agency of the Waverly electric, manufactured in Indianapolis, Ind. This car ranks high among the electrics and has proved a popular one in the East. It is also one of the oldest in the United States. Mr. Gibson believes that with such a garage Portland people will begin to appreciate the many advantages of an electric and that the sale of these cars will show big increase within the year.

Peerless Agency Handles Rauch and Lang Cars

By an arrangement between the Peerless Motor Car Company and Rauch & Lang, the local Peerless factory branch has become the dealer for Philadelphia and vicinity in Rauch & Lang electric vehicles.

The conviction that the electric and gasoline vehicles occupy two distinct fields of usefulness and are in no way competitors is responsible for the assumption of the dealership by the Peerless Company.

The Peerless Motor Car Company of Philadelphia is now in a position to offer its patrons gasoline and electric vehicles of similar quality. Rauch & Lang, builders of fine coaches for sixty years, have succeeded in developing an excellent electric drive mechanism and its bodies mounted on these chassis are widely recognized as among the best in design and finish.

"In spite of its level streets, which offer almost ideal conditions for the use of the electric, Philadelphia in the past has been reluctant about according the electric carriage the recognition it has received in most other cities," said R. W. Cook, manager of the Peerless Company. "But the advantages of the electric are coming rapidly to be recognized, especially by women."

Mr. Cook has had a great deal of experience in handling electrics and he is thoroughly familiar with the local field.

Omaha's Electric Garage Rebuilt

In the reconstruction of the electric garage at Fortieth and Farnam streets, Omaha, Neb., many new features have been added for the convenience of its many patrons. One of these is the excellent car department, which enables the company to give first-class service for both electric and gasoline cars. Denise Barkalow is also handling a line of accessories for the trade.

In the reconstruction of this building the paint shop now occupies the entire north end of the building and the facilities have been greatly improved. The rough room occupies about 1,800 square feet and the burning and cleaning are done in this room. The color room occupies about 3,000 square feet, and the finishing room occupies about 1,575 square feet. This room has a double floor and has been built as nearly dust proof as possible, as the finishing process is probably the most essential part of the painting.

At the time of the tornado on last Easter Sunday most of the machinery was blown into the street, but it has been repaired and reinstalled in the machine shop on the second floor. At the present time Mr. Barkalow is having built in this shop a truck for the use of the company, the chassis of which is a Baker electric model "B" and represents a little salvage left from the tornado.

Across from the machine shop is the battery room, the same as before the storm, except that the wiring is now overhead, with drop wires, instead of running on the floor as before.

The south end of the second floor is devoted to storage purposes. The generator room is on the first floor, and cars in any part of the garage can be charged from one point. About seventy-five cars can be charged in one night by one man.

The electric garage is probably the only one in Omaha using vacuum cleaner for cleaning out tires and cushions. The clock and chronograph is a very convenient feature, as it is a very accurate and simple device for checking the cars in and out, as well as the help. The time part of this clock was destroyed by the tornado and a new one has been installed.

This company is located in the heart of a district surrounded by many homes of automobile owners and is especially convenient for the women living in this neighborhood who own electric cars.

Paris Bans Gas Car for Fashionable Use

Paris, first of all the cities of the world to welcome the automobile, has also been the first to put a ban upon the gas car and to banish it from fashionable thoroughfares. On Easter Sunday there went into effect a law forbidding any kind of gasoline car to put in an appearance upon the most exclusive drive in the city—the Avenue des Accacias—between the hours of eleven and one o'clock.

As this is the smartest time of all the twenty-four hours, this edict means something more than would seem on first hearing of it. It is the time of all others when the monde walk, drive, or ride, and this particular avenue is the one of all the remainder in the Bois that is their meeting place.

Heretofore the gas car has been the principal means by which the fashionable world has reached the Bois. Now it will be the electric.

Baker Electrics in California

Because of the increasing demand for electrical vehicles, both pleasure and commercial, in Northern California, the Pacific Kissel Kar branch has decided to augment its gas car lines with a complete line of Baker electrics, which will be distributed throughout the entire state, excepting the county of Sacramento.

The local branch will have the disposition of all Bakers north of Santa Barbara county and east to the state line, while the branch in Los Angeles will take care of the entire southern territory.

C. B. Henderson, sales manager of the pleasure car department, and George H. Kelly, sales manager of the commercial cars for the Baker Electric Company, after having made an extensive canvass of the state and finding conditions of such a promising nature, at once got in touch with President W. L. Hughson of the Pacific Kissel Kar branch, with the result that a deal was consummated whereby the local branch will represent electrics throughout California. In speaking of the arrangement Mr. Hughson says:

"I am convinced that there is and will be a growing demand for electrics. Our efforts heretofore have been toward the development of the electric car business in the southern part of California, where the demand has created a very profitable market, and now after a conference with Mr. Henderson, who is conversant with electric vehicle conditions all over the country, I am positive that conditions are equally as promising in the north. A network of agencies will at once be organized throughout the state."

John H. Eagal, one of the most versatile automobile men on the Pacific Coast, whose many years' experience with both gas and electric driven vehicles gives him the right qualifications for carrying the electric department to success, has been appointed manager and will have absolute charge of both the pleasure and commercial car lines. Mr. Eagal has gone to the Baker factory at Cleveland to make a detailed study of the methods of manufacture.

Borland Electric Makes Tour

"The idea that most people have of limitations of an electric car is bound to be changed," was the comment made by Mr. Dykstra, sales manager for the Borland electric at St. Louis, Mo., when he returned from a run probably never before attempted in an electric.

"One of our customers wanted to know whether an electric car could be driven with safety to the Sunset Inn and other near-by places of refreshment, and it was to prove this that we started this run.

"Starting out Thursday afternoon, we thought we would take the best road to Sunset Inn and picked the Big Bend road. We had not been over this road this spring, and were sadly disappointed to find that it was being graded and huge quantities of gravel put on it. Pulling through gravel is hard enough, but to have to pass grading wagons and get into the safe clay at the side of the road is still more difficult driving. In less than an hour's time we made the trip from Kingshighway and Delmar avenue to Sunset Inn.

"The road ahead of us toward Fenton looked smoother than the one we had just left, and the temptation to ride over it led us Fentonward. It was a pleasure to strike this road and probably for the first time the old bridge at Fenton rattled under the weight of an electric car. The innkeeper at Fenton was very much interested in our arrival, saying that it was the first electric to stop at his place and hoped that we had opened the way for many electric car users to make that a stopping place. The venerable innkeeper told us that the road from Fenton to Valley Park was in good condition, so we determined to add this point of interest to our trip. We had gone about a half mile up this road when we struck sand about five inches deep. We had solid tires on our car, which cut deeply into this and we thought that to turn back would be policy, but the road was too narrow, so we pushed forward.

"Anyone who has ever gone over this road will recall the steep hill which precipitates one into the Meramec. To hold the car on this hill was a test for the best of brakes made. We experienced no difficulty. The balance of the trip homeward over the Manchester road was uneventful, and we drove into the Cook garage with a car that looked as though it had gone through a desert sandstorm."

Charging Your Own Car

The Ease and Economy of Operating a Private Electric Garage or Charging Plant

BY JOHN B. RATHBUN

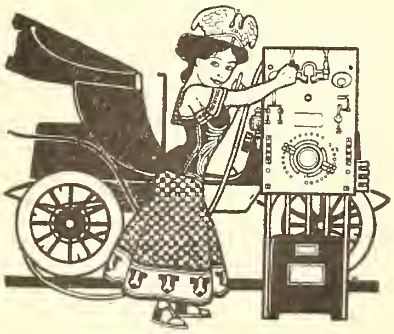
In the preparation of this article no attempt has been made to enter into the technicalities of the charging process. Its purpose is to give the electric car owner a generel idea of the appliances used and their practical application to the pleasure vehicle, as well as a few hints on the care of the storage battery. Charging is a very simple operation, especially when compared to the care and maintenance of the gas car, and requires no special mechanical or electrical knowledge.

With an alternating current circuit, the operation of charging your own car is nearly as simple as with the direct system, the rectifier requiring but two additional moves on the part of the operator. The efficiency of the rectifier is nearly twice that of the rheostat used with direct current; that is, nearly double the amount of energy is applied usefully to the battery when drawing the same amount of current from the mains. This saving, however, is offset by the expense of renewing certain parts of the rectifier, and by the comparatively great first cost of the instrument. The use of a rectifier cannot be avoided when the consumer is located on an alternating current supply line, as a simple rheostat has no effect on the reverse waves of the current, which, of course, would neutralize the effect of the charging waves. A battery left on such a circuit would be at the same state of charge at the end of a given time as it was at the beginning.

While there are several types of rectifiers, the most commonly used is the mercury vapor type, especially in small private garages. The active element of the mercury vapor rectifier is a glass bulb containing a small puddle of mercury, the interior of the bulb being exhausted to a comparatively low atmospheric pressure, or what is the same thing, a high vacuum. The current is led into and taken from the interior of the tube by three electrodes, two of these being of graphite, and the third formed by the mercury puddle. The two graphite terminals are connected to the two alternating current supply lines, while the mercury electrode is connected to the battery. The remaining battery wire is then connected to both of the graphite electrodes through a pair of "reactance" coils, or coils that damp down the alternating current without having any appreciable effect on the continuous current passing to the battery.

A fourth electrode is inserted in the tube near the mercury electrode which is used for starting the rectifier into action. By tipping the bulb so that the mercury covers both the starting electrode and the battery or mercury electrode, a current is allowed to flow from one electrode to the other. When the bulb is tipped back to its original or "charging position," the mercury drops away from the starting electrode, causing an arc or spark. When this spark is formed, a portion of the mercury is vaporized which forms a conducting path for the alternating supply current until the direction of flow changes.

When the reversal of current takes place in the supply line, it ceases to flow through the battery and mercury electrode, the vapor acting as a check valve so that the current can only pass through the battery in one direction. Such a tube would cease to operate after the first reversal if the reactance coils were not provided that continue to discharge current after the main impulse ceases, thus maintaining the arc between the two graphite and the mercury electrodes. While the graphite electrodes are alternately positive and negative, the discharge from either of them is always toward the mercury electrode which is connected to the battery. From the battery the current flows back to the line at either one or the other of the alternating current electrodes through the reactance coils in the circuit.



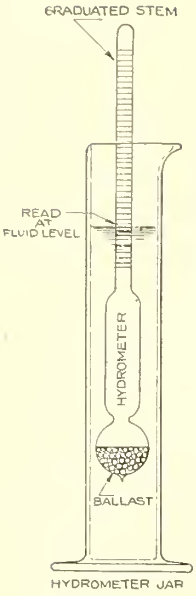
The bulb and necessary switches are mounted on a slate slab or switchboard, the reactance coils in an iron case forming the base of the instrument. When in operation, the mercury vapor arc throws a bright greenish-blue light from the back of the board. At the bottom of the board is regulating dial switch by which the battery charging current can be regulated. A small handle is mounted on the front of the board for use in rocking the tube when starting the arc, and a starting switch for temporarily connecting the tube to the alternating current line when starting. A small automatic circuit breaker for protection against overload completes the equipment of the board. No measuring instruments such as voltmeters or ammeters are ordinarily supplied with the smaller rectifiers for pleasure vehicles as the instruments on the dash are in circuit.

The actual operation of this type of rectifier is very simple. After inserting the charging plug in the vehicle receptacle, the alternating current line switch is closed. The starting switch is now held closed with one hand while the tube is gently rocked with the other until the tube starts to glow. After releasing the starting switch, which opens the starting circuit, the number of amperes flowing to the battery is adjusted by the regulating switch at the bottom of the board. As the charging proceeds, the voltage of the battery rises until at a point near the end of the charge it is again necessary to move the regulating switch so more current will pass into the battery. When the charging process is completed the alternating line switch is opened, and the charging plug is withdrawn from the vehicle.

CARE OF THE BATTERY.

When the battery is charged at home, care should be taken to keep it in as nearly a fully charged condition as possible at all times, not only for the reason of convenience in taking long rides on short notice, but in order to keep the cells in their best condition. Partially charged lead cells deteriorate rapidly, or "sulphate" when left standing, and if totally discharged will show the effects in a few hours, if not put on the current.

The amount of current left in the cell may be determined both by the voltmeter and by the specific gravity of the battery acid. The fully charged volt-



Jar Hydrometer.

age of a lead cell should be a little over 2.6 volts while the charging current is still passing through it. A forty cell battery will give a voltage of 2.6 times 40, or about 104 volts under the same conditions. When a battery is being charged the density or specific gravity of the battery fluid increases as the charging proceeds until it reaches a maximum at the fully charged condition. The specific gravity when fully charged is usually about 1280, which falls to about 1180 on complete discharge. As the gravity increases in direct proportion to the charge it is a direct index to the condition of the cell.

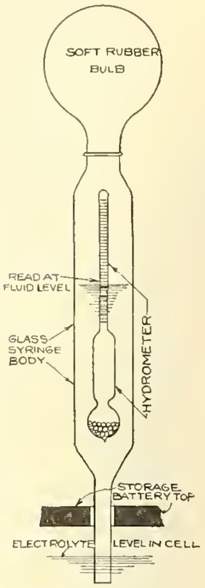
If the battery is found to be only partially discharged it is a great mistake to pass the entire current required for a full charge through the cells, for the current is not only wasted but a lasting injury is often done the plates of the cell as well. Estimate the cells discharge by the known service that the car has given since the last charge or by taking the specific gravity of the electrolyte by means of the hydrometer.

The hydrometer used in these determinations is essentially a form of float graduated in such a way that the observer can read the amount by which it sinks in a given fluid. According to a well known law, the depth of immersion is directly proportional to the density of the fluid in which it floats; the lighter the liquid the deeper the immersion of the hydrometer. Practically the hydrometer is in the form of a glass tube, closed at both ends and provided at the lower end with a weight of mercury or small shot. A paper scale of graduations is enclosed in the tube so that the specific gravity or density of the fluid may be read off directly, the weight being so adjusted that the zero of the scale corresponds to the point at which it would float in pure water at a temperature of 60 degrees Fahrenheit.

In order to obtain a high degree of accuracy through a small range of gravities, the storage battery hydrometer does not read to the zero of the scale, but only between two fairly close limits, from 1180 to 1280, these being the usual limits of the electrolyte density. Since the gravity of a fluid is influenced by the temperature, care should be taken that the electrolyte stands at the temperature marked on the hydrometer when the reading is taken, or if this is imposslbe, suitable corrections should be made before continuing the charge or adding either acid or electrolyte for adjustment.

When testing a cell, a small portion of the electrolyte should be removed from the cell by means of a battery syringe and poured into the hydrometer jar, a tall thin glass having depth enough to float the hydrometer freely, yet small enough in diameter to obtain results without the use of an excessive quantity of fluid. When the hydrometer comes to rest in the jar, the reading is taken by sighting along the surface of the fluid to the scale graduation that comes on the same level. If the hydrometer is provided with a thermometer giving the temperature corrections, the compensation should be made before any action is taken in regard to the charge.

Due to the loss by "gassing" or by evaporation, the electrolyte gradually becomes heavier through the loss of water and the operator should compensate for this by replacing the water until it is back to its original density. If the electrolyte is not kept within certain limits in regard to its density, the readings regarding the charge will be misleading.



Syringe Hydrometer.

In the majority of cases, the battery owner considers his hydrometer simply as an instrument for the determination of the charge and discharge limits of his battery. For this reason it is seldom used except during the charging operation, or when the voltmeter shows less than the limit placed by the manufacturer. One of the most important characteristics of the hydrometer is its ability to indicate the exact condition of the cell in regard to the amount of charge still retained by the plates, and in this capacity it is far more accurate than any strictly electrical instrument that could be included in the circuit. Voltmeters, ammeters, or wattmeters do not take the insulation leaks or internal losses into consideration.

The specific gravity or density of the electrolyte increases in almost direct proportion to the charge given to the cell, and therefore the density of the electrolyte as given by the hydrometer is a true index to the energy contained in the cell. If the density at full charge and discharge are known the charge at any other density may be figured out by simple proportion. The limiting densities may be had from the maker.

In nearly all batteries of the lead-sulphuric type, the hydrometer reading is about 1280 when fully charged and 1180 when discharged to the lowest safe limit. It will be seen that the density increases just 100 points from zero to full charge, which of course gives us a basis on which to figure our proportion. Each division on the hydrometer scale represents one per cent of the total capacity of the cell, so that a gravity of 1182 would indicate that the cell contained 2 per cent of its full capacity since 1182 is two points above the lower discharge limit of 1180.

If the capacity of the given cell is 150 ampere hours, for example, and the hydrometer reading is 1,200, the charge remaining in the cell will be 40 per cent of the total capacity, or 60 ampere hours. Numerically, the operation is as follows:

$$\frac{(1200-1180)}{100} \times 150 = 0.40 \times 150 = 60 \text{ ampere hours}$$

where the quantity 100 is used to obtain the hydrometer readings in terms of percentage. Should the capacity be given in kilowatt hours, substitute this quantity for that of the ampere hour unit.

When a storage battery is charged or discharged, a certain amount of the active material is torn off the plates and is precipitated to the bottom of the cell. Should this precipitate accumulate until it reached the bottoms of the plates, it would form a conducting path and more or less rapidly dissipate the charge or cause an internal short circuit. For this reason, the plates should be removed at periods of about six months or so, and the sludge should be thoroughly washed out by someone thoroughly experienced in this work.

[Editor's Note.—The first half of this article was printed in the May number.]

A Plea for Central Station Co-Operation

An Address to the Chicago Section, E. V. A. of A.

BY W. C. ANDERSON

This paper criticises the alleged indifference of the Commonwealth Edison Company, Chicago's central station system, to the opportunity for developing the electric vehicle business in that city through appropriations for garages, etc. At the request of the editor of Electric Vehicles, *a brief answer to Mr. Anderson was prepared by George Harvey Jones of the Commonwealth Edison Company, which is presented on another page.*

IN considering the electric vehicle situation in Chicago today the question invariably presents itself: What is the reason for the large increase of electricity propelled vehicles so evident on city streets?

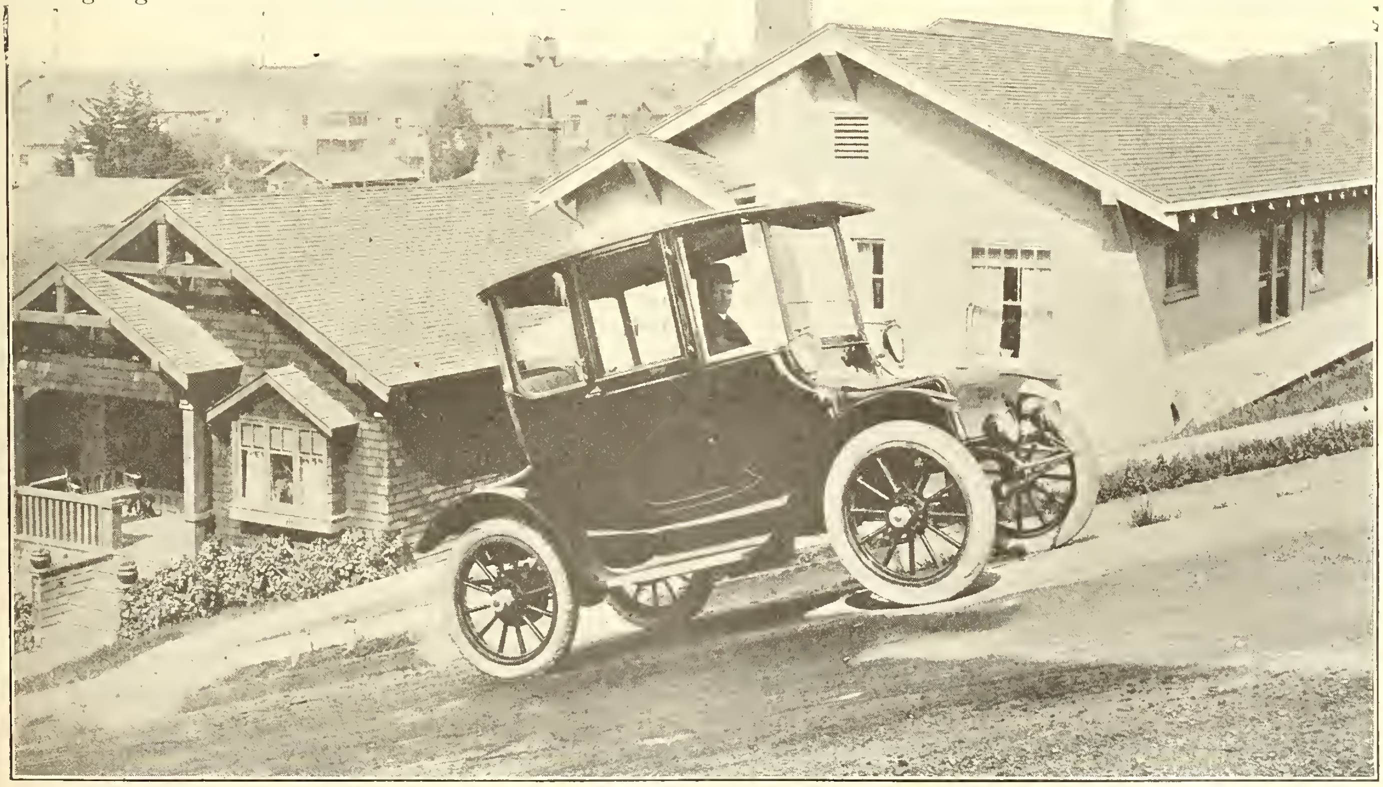
We must concede this condition of affairs has been very largely the result of strenuous efforts on the part of electric vehicle manufacturers, who until recently have had to fight the battle practically alone. They have invested millions of dollars in equipping the most up-to-date factories where a car of real merit might be produced, and then spent additional thousands to educate the people to understand that the electric car of today is a necessity which successfully meets the transportation conditions and requirements of the cities, and that it is no longer a "makeshift" or "experimental affair" as of former years.

All of this pioneer work necessitated a firm belief on the part of the manufacturer in the ultimate success of the industry, in spite of the indifference and opposition which was met with on every side. Responsible dealers paid little attention to solicitation for their aid, necessitating manufacturers having to establish branches at great expense in many of the leading cities. In the early days, even after selling the car, it was practically impossible to secure garage facilities for the owner which were fit to be considered. Demonstrating cars had to be maintained and demonstration after demonstration was given to the prospective purchaser, all of which cost thousands of dollars, in car depreciation, tire and battery wear and power consumption, which latter was paid for at high rates; and only too often all of these demonstrations resulted in nothing so far as sales went.

However, a new and encouraging co-operative situation on the part of those in allied industries is now in evidence. The conditions of the old days are changing rapidly. Splendid garage facilities are increasing. Every day power rates are being reduced, responsible dealers are going into our business everywhere, and selling methods are greatly improving.

No longer is it necessary to demonstrate the use of the electric car by twenty-five to fifty rides with the prospective purchaser. Today, a careful and thorough talk is given, then one or two demonstrations, and the proposition is settled one way or another.

Since we are interested primarily in discussing Chicago conditions, allow me to consider for a moment the relations existing between the Commonwealth Edison Company of Chicago and the electric vehicle industry in general. I cannot help but mention that I hope the great Chicago



Detroit Brougham Ascending 30.3 Per Cent Grade at Oakland, Cal.

Edison company will never find itself in the position, so far as our proposition is concerned, of the old darkey who was about to be hanged for murder. The judge asked him if there was anything he wished to say before the sentence was executed. His reply was, "Yes, Judge, I would like to say that this certainly am going to be a lesson to me." The poor fellow awoke too late. Just so I fear sometimes that the Chicago Edison Company will not realize the great opportunity offered in the electric vehicle industry and will postpone definite action so long that it will be too late to accomplish the great good which it might realize at this time through the proper co-operation with the various electric car manufacturers.

It has never been my good fortune to reside in this great city. However, business interests for the past twenty-five years have required my constant visits there. I have noticed from careful observation that a certain corner, located on Jackson boulevard and Michigan avenue, is the one most prominent in your city. A large portion of the Illinois Central suburban passengers pass this corner in going to and from their trains, morning, noon and night. Practically every vehicle passing between the North, South or West sides must pass this location, inasmuch as it is on the main artery between those parts. It is really astonishing, when the prominence of this corner is considered, that it has not been gobbled up by the United States Cigar Company for a cigar stand. Now, let us consider for a moment what the Chicago Edison company has done with this splendid location. It has transformed its main showrooms into one of the most attractive rooms it has been my pleasure to see. Turkish rugs are on the floor, the walls are beautifully decorated, the fixtures are of the finest—and staged among all this finery, we find such enormous power consuming objects as the electric flat iron, the electric curling iron, the electric water bag, the electric bread toaster, and numerous other articles the combined power consumption of which would probably not equal the power consumption required for charging three or four electric automobiles. And further may I inquire at what time of the day power for these articles is required? Is it during the off-peak period, or is it during the time when power consumption is greatest? The answer to this question is apparent—it hardly need be answered. To those of us who have nothing to do but sit on the fence and watch the procession go by, this "grab at the penny" policy, when dollars are piled up beyond, certainly causes us to smile, and sometimes, I fear, a little sarcastically.

Why not devote a portion of this splendid showroom to the display of an electric car housed in a private garage equipped in the most approved and up-to-date manner?

The rent and general expense required to maintain this display room would undoubtedly pay the rent and almost equip several electric garages throughout the city of Chicago, the advent of which would, without a question of a doubt, advance the use of electric cars very greatly.

There are people in Chicago who are anxious to buy electric cars, both pleasure and commercial, but who do not dare to purchase simply because they are not fortunate enough to live in a locality where an efficient garage is at their service, and circumstances are such that they cannot construct a private garage of their own; thus, lack of proper garage service is constantly hurting the sale of electric cars. It is a matter of record that some year and a half ago our own company endeavored to equip and maintain an up-to-the-minute exclusive commercial electric garage, but through lack of promised co-operation the station showed an abnormal loss, which resulted in our closing the doors. The entire loss of this experiment was sustained by the Anderson Electric Car Company and the Thomas A. Edison Company of Orange, N. J. This loss and embarrassment would never have been experienced if the proposition had worked out along the lines originally planned. The short existence of this garage, however, certainly satisfied us of the great need of such a station under the jurisdiction of an unbiased organization other than an electric car manufacturer. There is no question but that the lack of proper garage service in certain localities of Chicago is hurting the sale of electric cars.

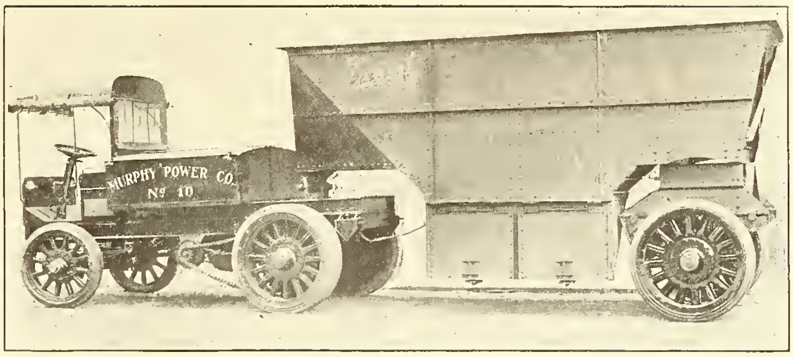
It may be possible that the Commonwealth Edison Company claims its charter will not permit opening a garage business. Certainly the management of the company is quite capable of arranging matters so that a high class garage system may be realized through it and yet in no way interfere with its policy, as has been the case in both Boston and New York City.

Suppose the company appropriate fifty or even one hundred thousand dollars; place it to the credit of the organization which may be formed by this Electric Vehicle Association of Chicago. It would be the duty of this organization to arrange for the establishment of a chain of garages throughout the city, where garages at present do not exist, manning them with expert workmen and equipping them with the most up-to-date apparatus. Pick the location for these garages where, at the present time, the garage service offered is the worst. If these garages were managed properly and were supplied with the current at a fair price, the garage organization would not only promote the use of electric cars, but would probably actually show a good profit.

In connection with the suggestions on the establishment of garages by the Commonwealth Edison Company it should not be assumed that I consider there are at present no efficient garages in this city. Quite to the contrary. I understand that in many localities the electric garage service is the best. These high class, efficient garages have, through co-operation of the Garage Owners' Association, and the "get together" idea, placed themselves in a splendid position to give excellent service at fair prices.

Our company has been keenly aware of the commendable efforts of the Garage Owners' Association, and has, on every occasion, endeavored to help the good work along by promoting the establishment of a uniform garage charge of $35.00 per month, and discouraging in every possible way any antagonistic feeling between garage owners which might have arisen through misunderstanding or otherwise. To meet Chicago conditions, a rate of $35.00 is more than fair to the car owner, for distances there are great, requiring large power consumption. Moreover, labor is high and rental cost great. In fact, after studying Chicago conditions carefully, we have concluded that it would be greater justice to all concerned if the garage company charged $40.00 per month, instead of $35.00, and we certainly hope that the $40.00 standard rate will soon be adopted so that the garage owner may extend the most comprehensive service and still make a fair profit on his business.

It would be an excellent move to devote a section of one of the proposed garages, or better, to appropriate a room in one of the Edison company's central stations, to a school for electric vehicle workmen, similar to schools now existing everywhere for the gasoline car; battery charging equipment, and electric vehicle construction could here be studied to the best advantage by young men who may desire to make electric vehicle work their trade.



Detroit Twelve-Ton Electric Coal Tractor.

Such a school would soon produce a higher grade of workmen to supply the rapidly growing demand which it is now impossible to meet satisfactorily. Large quantities of unskilled labor, of course, is always available, but the trained workman who knows how to meet emergencies is certainly at a premium in this work.

Further, the school would have an excellent effect on young men in satisfying them that the electric vehicle business recognizes the merit of high grade workmen and that the trade, when well learned, would offer them constant employment in either the garage or factory. Personally, I should be very glad to offer a chassis to be used for studying purposes if such a school is established. The future in our business for the young man of sterling qualities is indeed bright.

Consider the proposition merely from the standpoint of the Commonwealth Edison Company. Would it not be a most excellent move? It certainly would mean that the off-peak power consumption would be much greater.

You gentlemen in Chicago have sat back in your chairs and allowed such cities as Detroit, considering the relative population, to outstrip you 50 per cent. so far as electric vehicles are concerned. In Detroit it is not necessary that the central power station company establish garages, inasmuch as that matter has already been cared for by ourselves. However, the Detroit Edison Company is constantly striving to aid and promote the interests of the electric vehicle, which it realizes is closely allied with its business. To the smallest consumer of power, for an electric car in the city of Detroit, the central power station company offers a rate of 4 cents less a discount of 5 per cent. To those using larger quantities, the rate gets down to about 1½ cents. The Chicago Edison Company can make no comparative claims of merit regarding the charge for power to the individual consumer. With large consumers it supplies current at excessively low rates, even as does the Detroit company. Let me state to you right now that a person or concern, in order to secure a reasonably low rate in Chicago, must consume an almost impossible amount of current, as is constantly evidenced by the rate being charged for the requirements of our Chicago branch. In March the rate charged was 10 cents per k. w. h. Working as we are, with our coats off and our sleeves rolled up, straining every energy toward the sale and maintenance of electric cars, the sale of which indirectly results to the central station's benefit as well as ours, we certainly feel that very little appreciation is shown when we are forced to pay what might be called a premium, for indirectly promoting that business.

The man who starts an electric vehicle garage in a new territory naturally has but a few cars to begin business with. During the time he is getting started he naturally has innumerable discouraging affairs come up and on top of all these things he is forced to pay high rates for charging current, because of his small consumption. Surely this policy is not encouraging him in the work we all desire to see prosper.

Now, the power consumption of electric vehicles should certainly be considered on a wholesale basis by the central power station company. It should consider the electric vehicle power consumption as a whole, not as the requirements of various individuals. It should place the price for it at so low a figure that the average individual who is considering an automobile for town or city use, will favor the electric because of its low comparative cost of transportation energy, as well as its simplicity of operation and low upkeep cost.

Mr. Edison was certainly right when he said that the "traffic of our large cities would within five years be almost entirely electrically propelled." Just think of the work to be done in supplying the demand which Mr. Edison predicts, and which we all feel to be the logical requirement of the time. It is a duty we all owe to our young men to impress this fact upon them, and do what we can to enlist them in our ranks, since every indication points to the fact that the electric vehicle industries can offer them a permanent and substantial occupation.

At this time, when the price of gasoline is going up in leaps and the quality is going down in bounds, we should be in a position to avail ourselves of this opportunity to emphasize the low fuel cost of the electric car.

If you are waiting for a precedent to be established which may govern your action, consider what the central power stations in other cities have done. In Boston, prior to October 1, 1912, a consumption of 100 kilowatt hours per month cost the consumer $10.00. The same consumption would now cost the consumer about $4.00. The Boston Edison Company states that since this reduction in rate the increase in consumption has been most satisfactory.

The Boston Edison Company owns and successfully operates an electric garage which has proven so satisfactory that large additions are at present being made. The company owns and operates 56 electric vehicles, purchased from eight different manufacturers. Further, it has already expended in the promotion of the electric car business at least one hundred and fifty to two hundred thousand dollars, and will continue advertising on this same generous plan.

The New York Edison Company has just appropriated fifty thousand dollars to be expended at the rate of ten thousand dollars per year for the establishment of an electric garage and will spend, during the coming year, not less than one hundred and fifty thousand in advertising the merits of the electric vehicle. It is operating 103 electric vehicles purchased from six different manufacturers.

In western cities, such as Seattle, current rates are as low as 2 cents per k. w. h. to the consumer and ¾ cent to the electric garage of the size such as our company operates in those cities. In Seattle our commercial cars of one ton capacity are being operated for 25 per cent per day current cost. It is very apparent that these figures are most interesting to the merchant who is considering the installation of commercial vehicles.

Chicago should be, because of long distances and level road conditions (with the exception of the Logan Monument hill) the greatest electric car city in the world. Suppose there were 5000 electric pleasure cars and 5000 electric commercial cars in Chicago, instead of, as at present, 3000 pleasure cars and 600 commercial cars. The income resulting therefrom to the Chicago Edison company for power alone would be approximately one million six hundred and eighty thousand dollars per year, instead of the comparatively small amount as at present. May I ask what other department of the business offers such desirable possibilities? These figures are based on an average current charge per month of $8.00 for pleasure cars and an average current charge per month of $20.00 for all commercial vehicles. It appears further that there are 100 electric cars in service by the Commonwealth Edison Company practically all of which have been purchased from two companies. Would it not have been a fair proposition and created much better feeling if the Chicago Edison company had distributed these purchases among all of the responsible electric car manufacturers, as the other central power stations have done?

The next point which I believe the Chicago Edison company should act upon is the lowering of its electric power rates to the individual consumer as well as the wholesale consumer, when the current is used for charging electric vehicles. Do these things and you will find that together with the splendid publicity which is being carried on by the Electric Vehicle Association, they will advance the electric car business in this city 100 per cent within the next two years.

Just consider the satisfaction of the electric car owner and how he would boost when he felt that he was keeping his electric car in an absolutely neutral garage, constantly under the charge of experts who would not destroy batteries, ruin the varnish on his car, or willfully tamper with its mechanism. If a system of garages possessing these characteristics will only be developed, you need have no worry about the future of the electric automobile; but if these things are neglected, the gasoline car of today, with its electric starter, its electric lights, its electric gear shifters, and other apparatus, will surely be a factor to contend with in the electric car industry during the next few years. Let us all put our shoulder to the wheel and prevent such an occurrence.

And now just a word regarding co-operation of competitive electric car dealers and salesmen tending towards the common good of the industry. Suppose I am a keen, successful business man who in the course of events determines to buy an electric automobile for my family. After reading up on the subject to the best of my ability I go to the salesroom where cars of a prominent make are on display. I am there met by a salesman who suspiciously questions me for a time to learn if I am connected with some competitive concern. After assurance that I am a real buyer, Mr. Salesman starts a tirade on why I should *not* buy the other fellow's car, leaving me to deduce, I presume, that it would be absurd to buy any car but the one he represents. I, of course, say nothing, but decide that I have been unfortunate in meeting a salesman who is new at the business and therefore tries to cover his embarrassment and ignorance by rambling generalities against his neighbor. So I get away as soon as possible and go to No. 2.

Here a young man cordially greets me, and after I have told him my name and address, which information he insists upon having, he proceeds to tell me that for a long time he has been wishing for an opportunity to sell me a car—he has felt that my prominence would greatly aid him in making more sales, and just to show you how much he values my order, he offers a splendid discount. Somehow, I feel this concession is about to be offered, and I therefore try to interrupt the salesman before he has voluntarily committed himself, for I rather like the car he represents and do not care to have it cheapened in my opinion by knowing it is of a "discount class." But no, the salesman has learned his story word for word and insists on giving it all to me without interruption. With my regard for the business qualities of the electric car sales management somewhat dampened, I pass on to No. 3.

Here, I am met by the pompous and important manager himself. His actions are plainly intended to convey that his position in life is indeed a mighty one and that the automobile centers about his personally. Surely, I must believe the advice he is about to give me—he will show me the right path to follow. Of course, he knows I am a possible victim for the spies he has watching all the neighboring salesrooms have informed him of my approach. Through a series of well put questions, my tormentor learns all my family history, learns my little weaknesses and those of my wife and children, for he must know those things so as to give me just the right car to fit my requirements.

He inquires if I have any second-hand automobiles, carriages or horses, which I would like to trade in as part payment for the new electric. I remember that my neighbor has an old gasoline car which has been stored away in his barn for several years, which he has many times threatened to give to the junk man. Right here, I determine to cheat a little, for I have become convinced that my particular order means a great deal to the man who sells me, and I propose to take advantage of it. To make a long story short, I am offered $1,000 for my friend's old car, which I know I can buy from him at less than $100. At this point, I begin to grow suspicious. Why should all these things be offered to me? Is it possible I am going to get something for nothing? Am I really a great personage, whose actions will govern many others? No! There is something wrong. I reason that there must be an abnormal profit on the electric car or else the various dealers have a stock of obsolete models which they wish to pawn off, or perhaps they are going to start me off easy and get me hard later on. The more I ponder the more disgusted and bewildered I become, and finally I determine to wait another year.

Had each salesman confined his talk to the merits of his own product in a clean-cut, business-like way, quoting me the list price of his car, always recommending the electric, and intimating just a little pity at my folly when I suggested concessions of any kind, I should today have a hearty respect for the entire business.

To the salesmen, let me say:

Don't knock.

Don't talk about the other product or the manufacturing organization behind it—talk your own exclusively.

Sell your car on merit, not price.

Don't promise concessions of any sort not specified in your catalog.

Don't allow fictitious values on old cars or anything else that you take in trade.

Be fair with and respect yourself, your competitor, your customer and your employer.

Follow these rules and the automobile world will be a better place to live in.

Electric Pleasure Cars in Front of the Fashion Garage, Cottage Grove Avenue, Near 46th Street, Chicago. Commonwealth Edison Service.

What the Commonwealth Edison is Doing

A Reply to the Charges Made by W. C. Anderson

BY GEORGE H. JONES

THE Commonwealth Edison Company of Chicago, is a thorough believer in the electric vehicle for both commercial and passenger transportation, and is willing and anxious at all times to do all that it can to promote a wider use of electricity for this purpose. The company is endeavoring to "practice what it preaches," as is evidenced by the fact that it has been using electric vehicles in its business for fifteen years, and now has in operation and on order about 100 electric vehicles representing an investment, including garages and equipment, of upwards of $300,000.

In addition to this the company has widely advertised the electric vehicle in the newspapers, on billboards and by means of frequent articles which have appeared in its *Electric City Magazine*. Then, too, it has gotten out booklets from time to time, giving lists of charging stations, maps showing good roads, and other general information designed to be of assistance to the electric vehicle user; also several men in its organization are devoting their time to the electric vehicle business with the view of aiding it as much as possible.

The company believes that for any business the best advertising agent is a satisfied customer, and this is especially true in the case of the electric vehicle.

While it is true that a minimum of care and attention is required for electrically operated vehicles, yet to secure maximum results proper care must be given batteries and equipment. Acting on the theory that large public garages can better afford to employ competent help, the company is endeavoring to assist them by offering very attractive rates for electricity required. Although these new rates were put into effect only one year ago, most of the large garages in the city are now taking advantage of them, so that fully 85 per cent of all the electric vehicle charging in the city is done with power secured from the central station company; in fact, there is no question at this time but that the central station is the logical source from which to get power for vehicle charging.

Although the showing thus far made by the electric vehicle in this community is in many ways satisfactory, the future possibilities are enormous as there is no reason why *all* the city transportation should not be done electrically. The Commonwealth Edison Company is trying to make it so.

A Chicago Garage Interior. Commonwealth Edison Service.

At the N. E. L. A.

The thirty-sixth convention of the National Electric Light Association, held June 2 to 6 at El Medinah Temple, Chicago, brought together a great number of electric light and central station men from all parts of the country. In the deliberations of the association the subject of electric vehicles was not given as much time and attention as the friends of the battery driven car thought it deserved. Only one paper pertinent to the subject was read but that started enough discussion to convince those present that there should have been more.

"The Central Station's Greatest Opportunity," by Edwin E. Witherby, Chicago manager for the Electric Vehicle Company and an old central station man, was read Thursday morning. The paper is printed in full on another page. The discussion which ensued was started by Douglas Burnett, of Baltimore, with a description of the work done by the Baltimore central station. He said the electric light company was forced into taking a vehicle agency by the lack of sales representation in Baltimore, while gas trucks have 44 active agents there.

W. H. Blood, Jr., of Newark, N. J., a past president of the Electric Vehicle Association of America, urged a consideration of the charging load and its desirability to the central station. He pointed out that the increasing cost of gasoline and the decreasing cost of electricity, as well as the low tire and maintenance cost of the electric, favored its great future development.

John C. Parker said that in his city, Rochester, many garages had made so low a rate in striving for new business that they could no longer give good service—which condition is detrimental to the electric vehicle business of the city. The central station, he thought, should not establish garages because of incurring the enmity of garage owners. The Rochester central station makes a charging rate of one and one-fifth cents for off-peak business, and an expert is employed to operate with garages and manufacturers. He suggested synchronous motor-generator installations for garages, running the motor during the day as a synchronous condenser to improve the system's power factor.

C. W. Smith of New York took exception to any criticism of central station activities in the vehicle field, and quoted figures to show that about 60 per cent of contributions to the fund of the Electric Vehicle Association came from central stations, while only half the vehicle manufacturers contributed.

F. D. Beardslee of St. Louis stated that the Union Electric Light and Power Company of that city originally installed charging equipment in a local garage, maintaining an employe at the garage. Later it opened its own garage, which was subsequently sold through the awakened interest of the garage men, and now the company acts only in an advisory way.

G. B. Tripp of Harrisburg contended that charging cost is already a very small item, and that the first cost of electrics would have to be reduced before the industry could reach its full development in competition with gas cars.

S. M. Kennedy of Los Angeles insisted that central stations should use electric vehicles exclusively in their own business, saying that his company uses twenty and is replacing horses with electrics rapidly.

E. F. Lawton of Hartford said his company used nothing but electrics.

E. E. Witherby, author of the paper discussed, answered the criticism of Mr. Smith of New York with Long Island City. Representatives in attendance were the statement that fully 75 per cent of the central stations he had visited west of Pittsburgh were not favorable to the electric. This closed the discussion.

The only electric vehicle exhibited at the convention was a truck chassis of the General Vehicle Company, Long Island City. Representatives in attendance were P. D. Wagoner, E. E. Witherby, W. J. McDowell, E. W. Curtis, Jr., T. W. Barnes, J. S. Gorham and H. W. Hillman.

The Cooper-Hewitt Electric Company, New York, displayed battery charging rectifiers. In charge were George C. Keech and I. B. Carey.

The Edison Storage Battery Company, Orange, N. J., showed storage batteries and parts. C. B. Frayer, W. G. Bee and W. C. Andrews were in attendance.

The Electric Storage Battery Company, Philadelphia, showed lead storage batteries and parts. G. H. Atkins, C. Blizard, R. I. Baird, D. Parker, T. Milton, E. Kelly, T. Cressey, J. Rosholt and P. Rebel were present.

The Electric Vehicle Association of America had a booth with Harvey Robinson, F. W. Smith, H. E. Niesz and W. J. McDowell in attendance. Samples of advertising copy used in the association's campaigns, printed reports and other literature was distributed.

The Sangamo Electric Company of Springfield, Ill., and the Weston Electrical Instrument Company of Newark, N. J., displayed measuring instruments.

The General Electric Company and Westinghouse Electric and Manufacturing Company showed lines of their electric motors and rectifiers.

List of New York Charging Stations

A handbook of value to automobilists is being distributed among users of electric vehicles by the New York Electric Vehicle Association. The volume includes a list of charging stations in New York, on Long Island, upstate as far as Hudson, east as far as New Haven, west as far as Easton and south to Philadelphia and Atlantic City. All of these points are indicated on a map which gives the distances between points and indicates the most direct routes and all the points in the territory are within a day's electric run of New York. In the city itself the charging stations are listed by localities. There are also chapters describing different types of storage batteries, with instructions for their care and operation. The lists, map and chapters of instruction were prepared by the automobile bureau of the New York Edison Company, which is co-operating with the electric vehicle dealers of the city.

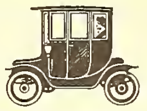
Electric Car Expert Brought to Toledo

Believing that electric truck and delivery wagon will replace the gasoline driven vehicles to a certain extent, Rail-Light officials announce that an expert on electric vehicles will be brought to Toledo.

The expert will furnish data concerning the operation of the electric trucks to all Toledoans who desire it and will aid in the development of the electric truck industry.

One of the first heavy trucks operated by electricity to be used in Toledo was placed in service by the American Express Company and was purchased from the Elwell-Parker Eletric Company of New York. Lucian C. Brown, a representative of the company, who was in Toledo for several days, says that the electric trucks can be operated cheaper than the gasoline car and can do the work of several teams.

EDITORIAL SECTION



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Changes of advertising copy should reach the office of publication not less than ten days in advance of date of issue. Regular date of issue, the first day of each month. New advertisements will be accepted up to within five days of date of issue, but proof of such advertisements can not be shown in advance of publication.

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Remittances—Remittances should be made by check, New York draft or money order, in favor of Electric Vehicles. Foreign subscriptions may be remitted direct by International Postal Money Order.

Change of Address—The old address should be given as well as the new, and notice should be received two weeks in advance of the desired change.

This publication is free and independent of all business or house connections or control. No manufacturer or supply dealer, or their stockholders or representatives, have any financial interest in Electric Vehicles *or any voice in its management or policy.*

CHICAGO, JUNE, 1913

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THE MOTIVE BEHIND THE PURCHASE.

DISCUSSION, even among men whose knowledge of the electric vehicle business is unassailable, brings out a number of opposing views. The vehicle manufacturer, very naturally, insists that a lower rate for battery charging would result in a greater number of users of his product. The central station man, on the other hand, maintains that the selling price of electric vehicles should be reduced before a popular demand can be created, and that the charging rate is already reasonable. And at a recent meeting of vehicle interests a third theory was given expression: That the electric pleasure vehicle is a *de luxe* commodity, and should be sold only to the well-to-do, who, presumably, care nothing for expenses, whether of first cost or maintenance.

Selling an article of supreme excellence, the *ne plus ultra* of luxuries, is always attractive. In this country especially the best and highest priced always finds a market. We Americans are not thrifty. If we are economical, it is in the sense that "the best is cheapest in the end." When we are fully convinced we want a thing we are readily persuaded to spend more for it than we intended, if by doing so we can get a proportionately better article. It is safe to say that many of the buyers of electric pleasure cars today will pay a thousand dollars more for the car that suits their fancy, rather than accept one that interests them less. And in the gas car field, the buyer of *de luxe* tastes and plethoric purse is amply provided for by a number of manufacturers.

Nevertheless, we must not lose sight of the fact that if the gas car industry had remained dependent upon the buyer who was able and willing to pay three thousand dollars or more for a car, its present development would have been undreamed of. Today, indeed, the United States is remarkable, in a world-wide industry, for the excellence of its gas cars which sell for less than one thousand dollars.

There are in the United States approximately 100,000,000 people. The average income is less than fifteen dollars per week per family. Approximately one man in a hundred has an income of a hundred dollars a month. Yet there are in this country nearly a million automobiles. Could that condition be possible, or could even twenty per cent of the development indicated be possible, were it not for the cheap car?

The wealthy, prodigal buyer is taken care of by the gas car makers—but to an even greater extent is the buyer of slender means provided for. And in few, if any, cases does the same manufacturer attempt to care for both. The automobile maker generally specializes on a product of certain characteristics and consequent value. So we can buy a new gas car for any price between, say, four hundred dollars and six thousand dollars, or a second-hand car that still operates for almost any price; and if we want to pay more, we can have a domestic or imported car made to our order.

In the electric car field the upper scale of gas car prices is paralleled. We can go up to fifty-five hundred or six thousand dollars if we wish. But we cannot go very much below two thousand dollars less and have any choice of style or equipment.

Nor is there much evidence that prices should be lower than they are for electric pleasure cars of the present standard of excellence. Doubtless, as has been suggested more than once, an inevitably increased demand will result in a natural reduction of manufacturing and selling cost and consequently in a lower price. These causes, however, can never produce a really revolutionary reduction of price. The changes, indeed, will be insignificant and inconsequential so long as existing quality is maintained. And that it should be maintained is obvious. There must be no slump in present values. There are other ways of meeting a demand for popular priced cars.

But to say that the electric pleasure vehicle is essentially a plaything for the rich, and that it should be made exclusively for the rich, and its literature written to the rich, is belittling its service to humanity in extraordinary degree. No utility can aim to serve only a part, and indeed a very small part, of the social body, and meet with any broad success. The electric vehicle is too marvelous an invention, too important an addition to civilization, to remain subject to the whims of those who buy today without thought of cost, and perhaps discard tomorrow with the passing of a fancy.

No. The electric pleasure vehicle has been in the luxury stage of its development for some time. It may never become an actual necessity; but its greatest field lies in that broad realm of the middle class buyer, and that field is ripe for exploitation. Let the present makers maintain their standards; for the advent of a plain, practical, thriftily built, low-priced car would not hurt their business one iota. The people who buy three thousand dollar cars today want to buy cars of that value; and they and their class will continue to do so, even though the market were flooded with thousand dollar cars.

By this we mean that the existing makes of cars are worth their price, if the right sort of service goes with them. The car that shall conquer the middle class field must be a new model designed for low cost, and not a *de luxe* model with the price shaved down.

Keep up the appeal to the rich. Let the electric continue to be, as it is now, the essence of luxury. But do not deny it also the big field that the gas car has entered successfully. Aim to be prepared for the day when even the comparatively poor man can own a modest electric. That day cannot come this year; probably not next year, and maybe not for several years. But it will come and must come before the electric vehicle industry can reach the development it deserves.

"JUST LIKE A GAS CAR"

At least one advertiser of gasoline automobiles has used the slogan, "As simple as an electric," while more than one builder of electric cars has not only followed, in some models, the lines of the gas car, but has made bold to say so. This fact seems to have given rise to some little merriment on the part of the unthinking. Imitation, they say, is the sincerest flattery. The mistake is in confusing imitation with naturally parallel development.

Both gas and electric car makers have devoted much time and study to the design of suitable bodies. The gas car is preponderantly an open vehicle, with closed types as a variant. The electric is almost universally a closed car, with open types playing, so far, a secondary role. But since the advent of self-starters, many ladies are taking to driving gas cars (preparatory, we hope, to the acquisition of electrics), while, on the other hand, business men are looking with more and more favor on the electric. The result will be more closed gas cars and more open electrics—a balancing up of types to meet a more balanced demand.

After all both gas and electric cars are but machine driven carriages. The designer of bodies on both strives to combine utility and beauty; to cover the machinery and house the occupants with one graceful line. So if a gas coupe looks like an electric, or if an electric roadster looks like a gas runabout, the fact but shows that the designer of each has neared the final, most efficient construction. He has tried not to imitate, but to develop; and the similarity of his two efforts are but evidence that both are correct.

In brief, let the electric take and keep the best there is, regardless of its other possible applications.

ELECTRIC VEHICLES IN BRITISH COLUMBIA.

The number of electric vehicles at present in operation in British Columbia is 118, of this number 100 are pleasure vehicles and the remaining 18 are commercial trucks, according to the Canadian *Electrical News*. Until the present year the sale of electric vehicles in this province had been pushed by agents who handle both gasoline and electric cars. A few months ago the British Columbia Electric Railway Company was awarded an agency for commercial cars, and immediately entered upon a vigorous selling campaign in Vancouver. At the present time the company, besides owning one business car, operates a fleet of five electric trucks in its light and power department.

The first electric truck was sold in Vancouver a little over seven years ago, and despite hard usage, it is today still in active service. A two-ton truck purchased last year by the Brackman-Ker Milling Company was used in Victoria for a year and gave such satisfaction that this year the company placed an order for one 5-ton truck and one 2-ton truck.

A record was recently kept on the operation of the company's 5-ton truck for 27 days, and it was found that the truck averaged 25 miles per day, the current consumed during this period amounting to 1489kw. hours.

The British Columbia Electric Company is now erecting a garage in Vancouver for commercial trucks, and the rates being offered for storage, etc., are as hereunder:

Capacity of Truck	Garage Charges per month
750 lbs.	$45.00
1,000 lbs.	45.00
2,000 lbs.	55.00
4,000 lbs.	60.00
7,000 lbs.	65.00
10,000 lbs.	70.00

These charges cover storage of car, current as required and charging of batteries, daily washing and oiling, and minor adjustments.

As far as pleasure vehicles are concerned, the private garages take care of this branch of the business, the rates quoted being from $30.00 to $35.00 per month which includes the services mentioned above, in addition to calling for and delivery of cars.

Considerable success is reported by the British Columbia Electric Railway Company in its commercial business, the sales put through up till the present being one 2-ton truck to a wholesale grocery house, one 2-ton truck to a hardware merchant, one 1-ton truck to another hardware firm, and one 1-ton truck for use as a hotel bus.

Observations on Horse and Motor Trucking

Recent Investigation by the Massachusetts Institute of Technology

BY H. PENDER AND H. F. THOMSON

The Electrical Engineering Department of the Massachusetts Institute of Technology received an appropriation from the Edison Electric Illuminating Company of Boston in May, 1911, for the purpose of a study of the economics of motor truck operation. The work up to the present has been directed along two lines: First, the collection of operating costs from a number of users of commercial vehicles in the eastern part of the country; and second, the study of the performance of horse wagons and motor cars in typical services around Boston. The purpose of this paper is to set forth an outline of the methods pursued in conducting these lines of work and to indicate the character of information which is being collected. The data collected up to March 1, 1912, were summarized and published in a bulletin entitled "The Economical Transportation of Merchandise in Metropolitan Districts." All of the cost data upon motor trucks as collected prior to October 1, were summarized in a paper entitled "Notes on the Cost of Motor Trucking," which was presented at the 1912 convention of the Electric Vehicle Association of America. In this paper, which was subsequently issued as Vehicle Research Bulletin No. 2, there were discussed some of the more important factors bearing upon the use and cost of operation of motor trucks as shown by our study. The information being compiled by the Institute of Technology will be summarized and published from time to time. A copy of each of the bulletins will be sent gratis, upon request, to anyone interested in trucking and delivery work.

THE human element, particularly the drivers and care takers, may be the most important factor in the operation of a trucking or delivery service. In general, abuse should be avoided in the operation of any vehicle. The horse should not be driven too fast or too far, nor should the motor truck be overloaded, overspeeded, or run without proper inspection. Even if a company's executives order that abuse will not be countenanced, obedience of the order depends chiefly upon the operatives because it is very difficult to learn of abuse until after permanent injury has been done.

Driver's Mental Attitude: Another way in which the human element affects operation lies in the mental attitude of the driver toward his work. In some services it is understood tacitly among the drivers that a certain number of trips or deliveries constitutes a day's work. If this quantity of work can be done conveniently by a horse wagon, a motor truck is almost precluded. But in general the substitution of motors for horses may be expected to speed up all the movements of the driver, on account of the higher speed of the automobile. This acceleration tends to decrease the standing time for loading and unloading. Such a tendency has been noticed especially in observations which we have taken upon horse and motor trucks at the Boston freight terminals.

As already suggested, the amount of speeding-up of the driver's movements due to motorization will vary with different services. It is obviously impossible to predict the acceleration in any given instance without an intimate knowledge of all the attendant conditions.

PRESENT TRUCKING CONDITIONS.

For an understanding of the methods involved in the conduct of this study there is necessary an insight into the conditions influencing wagon operation at present. The service to be performed in the moving of merchandise within a thickly populated area, such as a large city and the surrounding suburbs, may range from the delivery of a small parcel to a customer's house up to the trucking of heavy freight from a railroad terminal to a warehouse. The three types of vehicles now commercially available for such work are: (1) the horse-drawn truck, (2) the gasoline truck, and (3) the electric truck.

The type of vehicle best suited for a particular class of service is in general dependent upon the nature of that service. A complete understanding of the character of the service to be performed, as well as a thorough knowledge of how each element of the service affects the cost of operation of each type of vehicle, is essential before a decision can be reached as to the relative economy of the three types of vehicles.

Importance of Standing Time: The amount of work which any truck can do in a working day depends, first, upon the number of miles it is driven in a day, and second, upon the standing time or time taken in loading and unloading. The first item depends primarily upon the speed of the truck, although in congested districts the speed may be largely determined by the average speed of all the traffic using the street. But the second item, which is equally important, depends primarily upon the loading and unloading conditions. The importance of the effect of standing time upon the cost of operation is frequently overlooked; yet this time item must be carefully considered, particularly when motor trucks are used.

Short Hauls: As an illustration, consider a horse-drawn wagon which travels 15 miles per day but which is actually moving only 3 out of 9 working hours; the average speed of the wagon therefore being 5 miles per hour. If this wagon is replaced by an electric truck of the same carrying capacity, whose average speed under the same traffic conditions would be 10 miles per hour, then the motor truck could cover this same distance of 15 miles in 15/10 = 1.5 hours; but if the loading and unloading conditions remain the same, the time required to perform the *same service* would be 6 plus 1.5 = 7.5 hours. That is, in 9 hours the motor truck could do only 9/7.5 = 1.20, or 20% more work, although its speed is twice that of the horse wagon.

However, in many short-haul services the superior ability of the motor truck, in comparison with the horse-drawn wagon, to get into position where considerable backing and other maneuvering is necessary may be of equal importance with the greater speed of the motor. This point is frequently noticed in work about mill yards, where the hauls may be comparatively short but where facility in reaching inconveniently situated platforms may be exceedingly important. The influence of the driver's mental attitude, as noted above, may also shorten the standing time of the motor and thus increase its quantity of work per day.

Long Hauls: On the other hand, the long-haul character of work offers to the motor an opportunity to utilize its superiority over horses with regard to greater speed and mileage capacity. In the case of a city store delivering goods to suburban branches, the length of a single trip is frequently as great as 15 miles, which would constitute a full day's work for horses. A motor could readily make two or even three trips in a day, as the standing time in such service can be made very small by proper loading and unloading facilities. Here the motor is able to multiply the tonnage moved in a day, and also offers improvement in the number of deliveries between store and branch.

Routing of Wagons: The routing of delivery wagons, especially in parcel work, is another feature of operation which requires special attention. Two factors limit the amount of load which a wagon can handle on a single trip, first, either the bulk or weight capacity of the body, and second, the number of trips which must be made per day. The former factor is taken care of by the use of a body of suitable capacity. The latter factor very often curtails the number of deliveries made on a trip, as a wagon which consumes two or three hours in traveling to and from its delivery territory can evidently handle fewer parcels than the motor car which spends only an hour in reaching and returning from its route. Deliveries cannot be made with economy unless the routes are carefully adjusted to the equipment.

Mileage Factor: The ratio of the actual number of miles per day which a truck is driven to the number of miles per day it is capable of running, under average conditions and without interference from other traffic, may be called the mileage factor of the truck in this particular service. The greater the mileage factor in any service, the less will be the cost per unit of the service. Therefore every effort should be made to maintain a high mileage factor. To accomplish this when motor trucks are substituted for horse wagons may require considerable change in the methods previously employed in the service using horse-drawn vehicles only.

Load Factor: In addition to a good mileage factor, the load-factor, or the ratio of the maximum load per trip to the capacity rating of the wagon, should also be kept as high as possible. If the vehicle does not carry its rated load on each trip, it is not performing the work with the greatest economy. In some lines where the quantity of work varies considerably with the season of the year, this may be a difficult adjustment, but in any case the size of vehicle should be carefully selected to fit the service in hand.

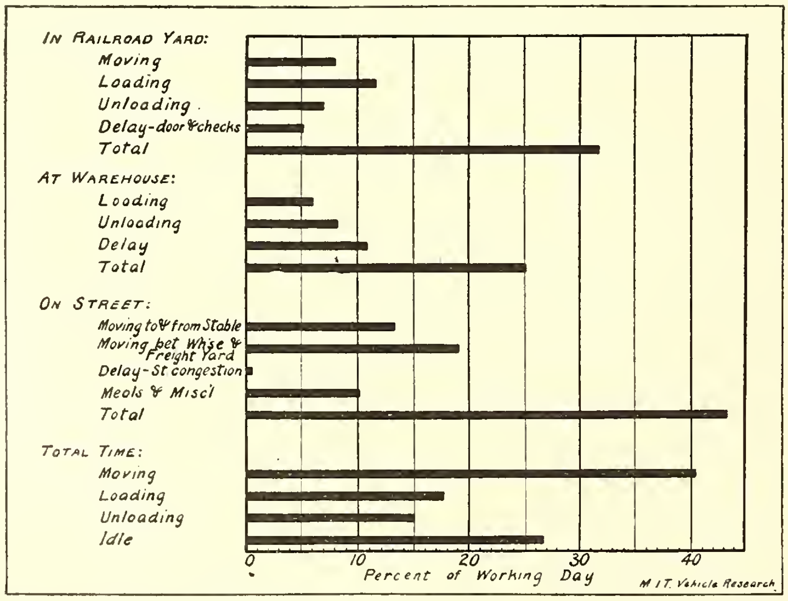

Fig. 1. Analysis of Daily Wagon Performance, Based on 13 Days'. Observations on 4 Wagons Handling Miscellaneous Freight.

FREIGHT DELIVERY.

The service of hauling freight from railroad freight house to dealer's warehouse, or vice versa, presents a particularly complicated problem. This is due to the diverse conditions which must be met, such as the railroad's organization of its freight houses, the relative locations of the stable, freight yard, and wholesale areas of the city, the fact that teams and merchandise frequently are owned by different parties, etc. In addition to the time often lost by a wagon at warehouse or freight house in receiving its load, there is also poor economy in the usual practice whereby a wagon moves with full load a comparatively small percentage of the working day.

There have been made by the Institute a number of studies upon the manner in which horse-wagons in the service of hauling Boston freight spend their day. Information for this work has been collected by making a log of every movement of a selected wagon from its departure from the stable in the morning until its return at night. The results of one of these studies, covering thirteen wagon-days' performance, are shown graphically in Fig. 1, in which the length of the horizontal lines represents the percentage of the total working day, or time out of stable (average 10.7 hr.), spent as designated.

Sources of "Lost Motion": From this plot it will be noted that the wagons spent on an average 32 per cent of the day at the railroad yards, one-fifth of which was delay; 25 per cent of the day at warehouses, nearly one-half of which was delay; and the remainder of the day, or 43 per cent, on the street. Of this latter time, 13 per cent of the day was spent in traveling to and from the stable morning and evening; the time spent in traveling between warehouse and freight yard was 19 per cent of the day, during 15 per cent of which there was at least a partial load on the wagon. In other words, these wagons spent almost as much time in waiting for loads at warehouses (11 per cent) as in actually carrying pay loads (15 per cent). Approximately the same amount of time (13 per cent) was lost in moving to and from the stable.

The average number of loads hauled between warehouse and freight yard was 3.5 per day, and the average weight per load was 1.8 tons. The total distance traveled per day was 13.5 miles, and the average length of haul was 0.9 mile.

That an enormous amount of "lost motion" exists with the present method of conducting this work is evident. The wagons are moving with a load, i. e., are performing their intended function, only a small portion of the day, and the average load is less than half that which the wagons could carry the necessarily short distances, provided the freight was collected and the business so organized that the larger loads could be obtained.

COST DATA.

Although mechanically driven wagons possess evident advantages in rapidity and radius of movement as compared with horse-drawn vehicles, the determining factor in selecting a vehicle for a given service is usually the cost of performing this service by the three types of vehicles. It should be remembered, however, that the cost of trucking must be considered in connection with the total profits earned. An additional cost of a fraction of a cent per package may be more than offset by the increase in business due to a reputation for reliability and punctuality in deliveries.

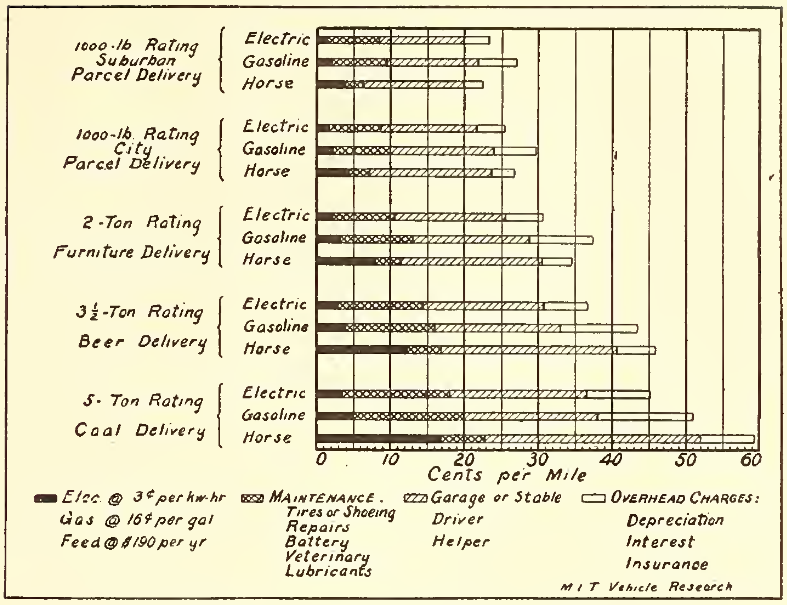

Fig. 2.—Estimates of Comparative Expense for Specified Services.

Method of Collecting Data: The collection of operating costs for trucking and delivery companies is being accomplished through personal interviews with the responsible officials of these companies. Among the cities which have been visited and from which data have been collected are New York, Chicago, Philadelphia, St. Louis, Boston, Detroit, Washington and a number of smaller cities in the same territory.

In those cases where the company was found to have in operation a comprehensive system for recording the itemized expenses of their equipment, there has been requested a summary of these records covering as long a period and as many cars as possible. In other cases where it has been found that a comprehensive report system was not in use, suggestions have been offered as to simple methods for obtaining some of the more important cost information, together with a request that the results of this tabulation be furnished for the purpose of the research work.

In all these cases it has been distinctly understood that any data furnished to the Institute would be considered as confidential and were not to be used for advertising purposes. In placing these data in reports there has been no reference to the identity of the companies furnishing the information.

Items Covered by Reports: The following table gives the list of items upon which data have been requested and obtained:

Tabulation of Data: The data obtained from the operators of vehicles have been arranged, as far as possible, in accordance wth the above subdivision. The purpose of thus arranging the information was to assist in arriving at logical average figures for the value of each of the several items. As already noted, the cost data upon motor cars which had come to hand prior to October, and which covered a sufficient length of time to be of value, were tabulated in Vehicle Research Bulletin No. 2.

PERFORMANCE DATA.

The second and equally important portion of the study has been directed toward the analysis of the performance of vehicles in different services. The information at present available on this subject is extremely meager, particularly in the case of horse-drawn wagons. The relative cost of performing a given service by means of the three types of vehicles, however, depends to a very marked degree upon the nature of this service, particularly upon the loading and unloading conditions and the limitations of speed due to street traffic.

Study with Registers: In order to obtain accurate data upon this subject the Institute had installed on a number of wagons and trucks special recorders, which furnish tapes indicating the stops and movements of the vehicle. Arrangements were made with six representative Boston firms for the installation of these registers on their wagons, and the three other local companies who were using similar registers furnished their tapes for daily analysis by the Institute.

This study included the movements of 63 vehicles, in sizes ranging from one-horse to three-horse wagons, and from 700 to 10,000 pound motor trucks. It covered the work of each vehicle throughout from 2 to 8 months, during the winter, spring and summer of 1912. From each tape a number of observations were made with reference to moving time, standing time, speed, distance, etc.

Observations Recorded: A number of typical averages of these observations are given in the following table:

TABLE 2. AVERAGE PERFORMANCE OF SIX WAGONS AS DEDUCED FROM RECORDS.

Rating Type	1000 lb. Electric	4000 lb. Electric	3,000 lb. Gasoline	6000 lb. Gasoline	1-Horse Wagon	2-Horse Caravan
Company No.	51	9	5	30	35	29
Co.'s number for truck	2	93	158	1	325	941
Service	A	B	C	D	E	F
Months of record	8	8	7	7	5	6
Miles per day	35.1	19.9	42.7	24.7	11.7	12.2
Trips per day	1.8	4.1	4.0	2.0	2.4	3.8
Stops per day	27.	12.	38.	12.	13.	14.
Miles per trip	19.5	4.9	10.7	12.4	4.9	3.2
Office to 1st stop, miles	2.4	1.9	3.2	3.1	1.1	1.3
Office to last stop, miles	2.7	1.5	2.8	4.1	1.6	1.7
Hr. in use per day	10.3	9.2	10.8	9.7	9.7	10.1
Hr. standing per day	6.4	6.4	7.3	6.8	5.7	6.1
Hr. moving per day	3.9	2.8	3.5	2.9	4.0	4.0
Hr. loading per trip	0.5					0.6
Hr. unloading per trip						0.6
Hr. for meals			1.0		1.3	1.1
Calls per day		11.			6.	7.2
Pieces delivered per day			40.			
Pounds initial load per day		8600.			7300.	29400.
Av'ge running speed, long runs	10.6	7.9	14.8	8.8		
Av'ge running speed, throughout day	9.8	7.0	12.3	8.5	3.0	3.0
Days used per month	21.8	27.2	17.5	20.7	21.8	24.0
Days out of com. per month	2.4	0.2	4.8	4.6	3.1	0.0
Days ready but not used per month	6.4	3.0	8.2	5.1	5.5	6.3

The letters indicating the service have the following significance:
A—Suburban parcel delivery.
B—Miscellaneous hauling.
C—Suburban baggage call and delivery.
D—Furniture moving and miscellaneous trucking.
E—Retail coal delivery.
F—Outbond freight for manufacturer.

This study comprises something over 100,000 individual observations. The results are at present being worked up into graphical and tabulated form, and are expected to be available very shortly. Similar information upon studies which have been made from time to time elsewhere and that which is contained in authentic magazine articles will also be included with the presentation of the data collected by the Institute.

TABLE 1. ITEMS OF REPORT FOR M. I. T. VEHICLE RESEARCH.

ELECTRIC TRUCK

General

Company
Business
Rated capacity
Period of data
No. of trucks averaged
Investment per truck
Age of truck
Company's number of truck
Battery (lead or Edison)

Performance during period of data

Miles traveled
Kw.-hr. consumed
Days used
Work days out of commission

Per day

Miles traveled
No. of trips
No. of deliveries
Weight of loads

Expense—Total during period of data

Operating charges

Lubricants
Electricity at —c. per kw.-hr.
Battery renewals
Tire renewals
Repairs, parts
Repairs, labor
Painting

Fixed charges

Garage, rent and general expense
Garage, labor
Sundries
Driver
Helper

Overhead charges

Amortization at —%
Interest
Insurance, fire
Insurance, liability
Administration

Co.'s total expense

GASOLINE TRUCK

General

Company
Business
Rated capacity
Period of data
No. of trucks averaged
Investment per truck
Age of truck
Company's number of truck
Tires (solid or pneumatic)

Performance during period of data

Miles traveled
Gal. of gasoline
Days used
Work days out of commission

Per day

Miles traveled
No. of trips
No. of deliveries
Weight of loads

Expense—Total during period of data

Operating charges

Lubricants
Gasoline at — c. per gal.
Tire renewals
Repairs, parts
Repairs, labor
Painting

Fixed charges

Garage, rent and general expense
Garage, labor
Sundries
Driver
Helper

Overhead charges

Amortization at —%
Interest
Insurance, fire
Insurance, liability
Administration

Co.'s total expense

HORSE WAGON

General

Company
Business
Reported, horses
Reported, single wagons
Reported, double wagons
Investment per horse
Investment per single wagon
Investment per double wagon
Investment per set of harness
Percentage extra horses

Performance

Days per year each horse worked
Days per year each horse unable to work

Per day

Miles per wagon
Trips per wagon
Deliveries per wagon
Weight of loads per wagon

Expense—Annual per horse

Shoeing
Veterinary
Feed
Stable, rent and general expense
Stable, labor
Interest and amortization
Insurance, fire

Per wagon

Wagon repairs
Harness repairs
Sundries
Driver
Helper
Interest and amortization, single wagon
Interest and amortization, double wagon
Insurance, liability
Administration

Co.'s annual expense per single wagon
Co.'s annual expense per double wagon

TABLE 3. 1,000-POUND RATING—ESTIMATE FOR SUBURBAN PARCEL DELIVERY.

Average maximum load in pounds, approximately	1,000
Miles, store to delivery zone	4
Deliveries per mile in delivery zone	6
Trips per day	2
Hours per trip for loading	1.0
Minutes per delivery	1.5
Hours working per day	9

	1,000 lb Electric	1,000 lb. Gasoline	1 Horse Wagon (⅔ extra horse)
Average running speed, to and from delivery zone, m. p. h.	11	15	6.5
Average running speed in delivery zone	9	9	5
Hours per day for loading	2.0	2.0	2.0
Hours per day to and from delivery zone	1.45	1.1	2.5
Hours per day in delivery zone	5.55	5.9	4.5
Miles per day to and from delivery zone	16	16	16
Miles per day in delivery zone	21	23	13
Miles per day, total	37	39	29
Deliveries per day	128	138	78
Deliveries per mile of total day's travel	3.5	3.5	2.7
Days used per year	285	270	285
Miles per year	10,500	10,500	8,300
Deliveries per year	36,500	37,000	22,000
Expense per year—			
Tires or shoeing	$ 170.00	$ 190.00	$ 60.00
Repairs	300.00	550.00	125.00
Battery	250.00		
Veterinary			10.00
Lubricants	15.00	50.00	
Electricity at 3c. per kw.hr	160.00		
Gasoline at 16c per gal		215.00	
Feed			320.00
Garage or stable	200.00	200.00	125.00
Driver and helper	1,000.00	1,080.00	1,000.00
Depreciation	165.00	305.00	160.00
Interest	60.00	60.00	24.00
Insurance	135.00	170.00	30.00
Total annual expense	$2,455.00	$2,810.00	$1,854.00
Cost per day	8.60	10.40	6.50
Cost per mile	23c.	27c.	23c.
Cost per delivery	6.7c.	7.5c.	8.5c.

TABLE 4. 1,000-POUND RATING—ESTIMATE FOR CITY PARCEL DELIVERY.

Average maximum load in pounds, approximately	1,000
Miles per trip	12
Deliveries per mile	6
Deliveries per stop	2
Hours per trip for loading	1.0
Minutes per delivery	0.9
Minutes per stop	1.8
Hours working per day	9

	1,000 lb. Electric	1,000 lb. Gasoline	1 Horse Wagon (½ extra horse
(½ extra horse)			
Average running speed, m. p. h.	9.5	10	5
Hours per trip, standing	2.1	2.0	2.1
Hours per trip, moving	1.2	1.2	2.4
Hours per trip, total	3.3	3.2	4.5
Average No. of trips per 9 hour day	2.7	2.8	2.0
Miles per day	33	34	24
Deliveries per day	198	204	144
Deliveries used per year	285	270	285
Miles per year	9,400	9,200	6,800
Deliveries per year	56,500	55,000	41,000
Expense per year—			
Tires and shoeing	$ 150.00	$ 170.00	$ 54.00
Repairs	270.00	500.00	125.00
Battery	225.00		
Veterinary			9.00
Lubricants	15.00	50.00	
Electricity at 3c. per kw-hr.	145.00		
Gasoline at 16c per gal		200.00	
Feed			290.00
Garage or stable	200.00	200.00	110.00
Driver and helper	1,000.00	1,080.00	1,000.00
Depreciation	165.00	305.00	160.00
Interest	60.00	60.00	24.00
Insurance	135.00	170.00	30.00
Total annual expense	$2,365.00	$2,735.00	$1,812.00
Cost per day	8.30	10.10	6.4
Cost per mile	25c.	30c.	27c.
Cost per delivery	4.2c.	5.0c.	4.5c.

TABLE 5. 2-TON RATING—ESTIMATE FOR FURNITURE DELIVERY.

Average maximum load in pounds, approximately	4,000
Miles per trip	12
Calls per mile	1
Hours per trip for loading	0.7
Minutes per call	6
Hours working per day	9

	4,000 lb. Electric	4,000 lb. Gasoline	2 Horse Wagon (1 extra horse)
Average running speed, m. p. h.	8	9	5
Hours per trip, standing	1.9	1.9	1.9
Hours per trip, moving	1.5	1.4	2.4
Hours per trip, total	3.4	3.3	4.3
Average No. trips per 9 hour day	2.65	2.75	2.1
Miles per day	32	33	25
Calls per day	32	33	25
Days used per year	285	270	285
Vehicle miles per year	9,100	9,000	7,150
Calls per year	9,100	9,000	7,150
Expense per year—			
Tires or shoeing	$ 225.00	$ 270.00	$ 108.00
Repairs	260.00	550.00	125.00
Battery	270.00		
Veterinary			18.00
Lubricants	15.00	50.00	
Electricity at 3c. per kw-hr	200.00		
Gasoline at 16c. per gal		285.00	
Feed			570.00
Garage or stable	220.00	220.00	220.00
Driver and helper	1,140.00	1,215.00	1,140.00
Depreciation	240.00	500.00	210.00
Interest	84.00	96.00	31.00
Insurance	140.00	180.00	35.00
Total annual expense	$2,794.00	$3,366.00	$2,457.00
Cost per day	9.75	12.50	8.60
Cost per mile	31c.	38c.	35c.
Cost per call	31c.	38c.	35c.

TABLE 6. 3½-TON RATING—ESTIMATE FOR DRAFT BEER DELIVERY.

Average maximum load in pounds, approximately	7,000
Miles per trip	14
Calls per mile	0.7
Hours per trip for loading and unloading	0.75
Minutes per call	8
Hours working per day	9

	7,000 lb. Electric	7,000 lb. Gasoline	2 Horse Wagon (2 extra horses)
Average running speed, m. p. h.	7	8.5	4
Hours per trip, standing	2.1	2.1	2.1
Hours per trip, moving	2.0	1.7	3.5
Hours per trip, total	4.1	3.8	5.6
Average No. trips per 9 hour day	2.2	2.4	1.6
Miles per day	31	33	22
Calls per day	22	23	15
Days used per year	285	270	285
Vehicle miles per year	8,850	8,900	6,250
Calls per year	6,200	6,230	4,370
Expense yer year—			
Tires or shoeing	$ 330.00	$ 380.00	$ 144.00
Repairs	300.00	625.00	125.00
Battery	360.00		
Veterinary			24.00
Lubricants	15.00	60.00	
Electricity at 3c. per kw.hr	265.00		
Gasoline at 16c. per gal		350.00	
Feed			760.00
Garage or stable	240.00	240.00	280.00
Driver and helper	1,210.00	1,280.00	1,210.00
Depreciation	290.00	610.00	250.00
Interest	102.00	120.00	38.00
Insurance	140.00	180.00	35.00
Total annual expense	$3,252.00	$3,854.00	$2,866.00
Cost per day	11.40	14.25	10.00
Cost per mile	37c.	43c.	46c.
Cost per call	52c.	62c.	66c.

ESTIMATES.

The collection of performance data as outlined above will furnish a knowledge of the fundamental characteristics pertaining to the present operation of trucking and delivery services. Knowledge of this character, coupled with the information upon the cost of the different items in operating delivery equipments as obtained from the experience of operators, will furnish a basis for estimating the comparative expenses of the three types of vehicles when operated in chosen services.

It is the intention to draw up from time to time series of estimates showing such relative expense. By varying the characteristics assigned to the different services the relative economic zones for the three types of wagons can be deduced. For instance, if a series of deliveries of coal at different distances from the yard are considered, the comparative expense of horse and motor truck delivery at different distances from the center of distribution can be pointed out.

There are given below the details of five estimates, which are based upon the cost data published in Vehicle Research Bulletin No. 2. Services for which the different capacities of wagons would be adapted have been selected as follows:

1,000 pound rated capacity, suburban parcel delivery.
1,000 pound rated capacity, city parcel delivery.
4,000 pound rated capacity, furniture delivery.
7,000 pound rated capacity, draft beer delivery.
10,000 pound rated capacity, coal delivery.

TABLE 7. 5-TON RATING—ESTIMATE FOR COAL DELIVERY.

Average maximum load in pounds, approximately	10,000
Miles per trip	6
Hours per trip for loading	0.2
Hours per trip for unloading	0.7
Hours working per day	9

	10,000 lb. Electric	10,000 lb. Gasoline	3 Horse Wagon (2 extra horses)
Average running speed, m. p. h.	6	7.5	3
Hours per trip, standing	0.9	0.9	0.9
Hours per trip, moving	1.0	0.8	2.0
Hours per trip, total	1.9	1.7	2.9
Average No. trips per 9 hour day	4.7	5.3	3.1
Miles per day	28	32	18.5
Tons delivered per day	23.5	26.5	15.5
Days used per year	285	270	285
Vehicle miles per year	8,000	8,600	5,300
Tons delivered per year	6,700	7,150	4,400
Expense per year—			
Tires or shoeing	$ 400.00	$ 520.00	$ 175.00
Repairs	300.00	700.00	100.00
Battery	440.00		
Veterinary			30.00
Lubricants	15.00	70.00	
Electricity at 3c. per kw.hr	290.00		
Gasoline at 16c. per gal		430.00	
Feed			900.00
Garage or stable	270.00	270.00	335.00
Driver and helper	1,210.00	1,280.00	1,210.00
Depreciation	400.00	760.00	300.00
Interest	135.00	150.00	45.00
Insurance	150.00	200.00	40.00
Total annual expense	$3,610.00	$4,380.00	$3,135.00
Cost per day	12.30	16.20	11.00
Cost per mile	45c.	51c.	59c.
Cost per ton delivered	54c.	61c.	71c.

The assumed characteristics of the service, that is, the times for loading and unloading and the distances between loading and unloading points, correspond closely with those now existing in large metropolitan districts. The suburban parcel delivery involves a run of four miles before delivering is commenced, the territory covered being from 4 to 7 miles from the store. The city parcel service includes the area within a 4-mile circle. The conditions of the furniture, beer and coal services contemplate an area within 4 miles of the loading point.*

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*In the estimates of Tables 3 to 7 the price of gasoline has been taken at 16 cents per gallon, which was the prevailing figure when the tables were drawn up. At any other cost per gallon the estimated annual expense for gasoline would change the proportion which the new rate bears to 16 cents. Similarly, if the price of electricity were other than 3 cents per kilowatt hour, the annual expense for electricity would change in the same proportion.

COMPARATIVE EXPENSES.

From the above estimates there has been plotted the chart of comparative expense given in Fig. 2.*

The expense items have been grouped under the heads of (1) Electricity, gasoline or feed; (2) Maintenance; (3) Garage or stable; driver and helper; (4) Overhead, including depreciation, interest and insurance. The expense per mile has been used as the basis of comparison in this figure in order to show the relative magnitude of the several heads of expense. It will be noted from the cross hatching of the columns that the cost of electricity and gasoline is only from 6 to 10 per cent of the total expense of operating a car, whereas the labor charge for driver and helper is from 30 to 40 per cent of the total. With regard to horse wagons the cost of feed is from 20 to 30 per cent and the cost of driver and helper from 40 to 55 per cent of the total. These figures serve to indicate the importance in operating an equipment of carefully considering the labor question. The relatively small value of the cost of "energy," i. e., electricity, gasoline, or feed, is also pointed out.

The following table has been deduced from the above estimates in order to indicate the comparative expense of performing the same delivery by each of the three types of vehicles under the conditions assumed.

TABLE 8. TABLE OF COMPARATIVE EXPENSE PER DELIVERY.

		Miles per day			Comparative expense per delivery Based on Horse Wagon Expense as 100%		
Rating.	Delivery Service.	Electric.	Gasoline.	Horse Wagon.†	Electric.	Gasoline.	Horse Wagon.
1,000 lb.	Suburban Parcel	37	39	29	79%	88%	100%
1,000 lb.	City Delivery	33	34	24	93	111	100
4,000 lb.	Furniture	32	33	25	89	108	100
7,000 lb.	Beer	31	33	22	80	95	100
10,000 lb.	Coal	28	32	19	76	86	100

†Extra horses are required to cover the distances given (see detailed estimates above).

CONCLUSION.

In considering these comparisons it will be noted that for the light cars, such as the 1,000 pound rating, the superiority of the automobile over horse wagons in so-called suburban service is extremely marked. This is work where hauls of considerable length exist between the points of loading and of beginning distribution. It will also be noted that in a limited territory, such as within a 4-mile radius of a loading point, the superiority of the motor cars over horse wagons increases to a marked extent with the size of the load.

The above conclusions are not applicable to all classes of work of the types considered, but only to those cases where the characteristics are similar to the assumptions upon which the estimates are based. The specific services selected are particularly suited for electric trucks. Other services, particularly where the distances traveled per day are in excess of 45 miles, would in many cases show a decided advantage in favor of the gasoline truck; and for very small daily distances, 12 miles or less, the horse wagon would probably prove the cheaper. It must, however, be borne in mind that each change in service requirements will produce a corresponding change in the cost of performing the service. In other words, *service requirements are as important a factor in determining costs as the type of the vehicle selected.*

According to figures compiled by the Electric Motor Car Club of Boston, electric motor trucks have increased nearly thirty per cent in Massachusetts over registrations for 1912.

Electric Trucks Advantageous for Delivering

"Among many transportation problems which are coming up daily in and around San Francisco, the proposition of successfully delivering the goods of the bakers, and likewise the creamery companies, has been a source of a great deal of discussion, as well as study, by the truck distributing companies, or at least all of them possess wagons of sufficiently small capacity to suit this business," says E. P. Brinegar, the president of the Pioneer Motor Truck Corporation, Oakland, Cal., agents for the G. M. C. trucks.

"The eastern cities have practically adopted the electric truck for this work, due to its slow operating cost, and to the facility with which it can be started and stopped with a minimum waste of power and mechanical upkeep, incurred by these said stops. We figure that in gasoline trucks, four full starts and stops will equal a mile on the straightaway, in both the consumption of gasoline and mechanical wear; while on the electric truck we figure that it requires ten full starts and stops to equal a mile on the straightaway and mechanical upkeep on the truck.

"The business of the bakery and the creamery are both done on small margins of profit. Take the situation of a creamery company in Oakland. Its route requires 300 stops. In using a gasoline truck over this route, the truck would have traveled 72 miles in starts and stops alone, while the electric truck has traveled only 30. The electric truck can be started or stopped more quickly than can the gasoline truck, and hence the additional speed of the gasoline truck is offset. The backing of an electric truck can be done in one-fourth the time of a gas truck, hence more time saved."

Vehicle Luncheon to N. E. L. A. Visitors

The Chicago section of the Electric Vehicle Association of America gave a luncheon in honor of the visiting members of the N. E. L. A. in connection with their regular Tuesday meeting, which was held at the Hotel La Salle, June 3. Short discussions and talks on the coming plans of the association were made by William McJunkin of Chicago, Harvey Robinson, national secretary, and F. W. Smith of New York; Homer E. Niesz the new chairman of the association, presided over the meeting for the first time.

Mr. McJunkin, who is the head of the McJunkin Advertising Agency in Chicago, outlined the plans of the association in regard to the publicity work that will be carried on within the next year. This advertising covers both the pleasure and commercial departments of the business in a most comprehensive manner.

Nearly $45,000 has been expended by the association within the last year for advertising and notwithstanding the fact that the work was done with the idea of placing before the public the coming importance of electric vehicles and not merely as a business stimulus, nevertheless it has created an undo amount of interest to the decided advantage of the manufacturer.

Mr. Smith, who is a most active one in the present advertising campaign, spoke of the necessity of cooperation between each and every one who is desirous of the ultimate success of the association. Contributions are requested from all interested. Mr. Smith stated further that this advertising publicity would be as diversified as possible to bring it to the attention of the greatest number of people.

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*In the Suburban Parcel Delivery the number of deliveries per week of total day's travel is larger for the motor cars than for the horse wagon (see detailed estimate above).

Cadmium Tests of Storage Batteries

Determining Equality of Positive and Negative Plate Charges

BY HUDSON F. SMITH

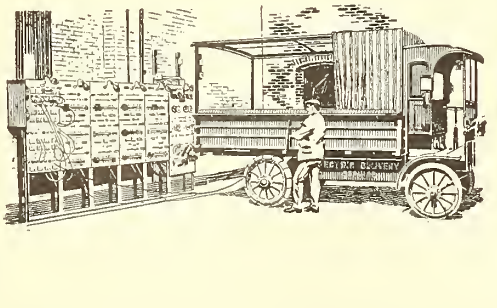
The capacity of a lead storage battery is sometimes diminished by a condition in which the positive plates become charged before the negative plates, and the negative discharged before the positive. This condition may be tested by means of a third electrode, made of the metal cadmium. Methods of using this test and the meaning of the determinations are explained fully in the article.

OWING to various internal conditions of the lead storage battery as well as the methods of charging, it frequently happens that the positive plates become fully charged before the negative, with the voltage across the line indicating a full charge. Since the capacity of the cell in ampere hours or watt hours depends on the condition of both plates, positive and negative, the operator who depends upon the terminal voltage of the cells often sends out a car that is much under its rated mileage or charge. Gassing or hydrometer readings seldom give more accurate indications of the relative charge on the two plates than the voltmeter.

In discharging, the battery having unequally charged plates will indicate through its voltage, a discharged condition before the more efficient plate is brought down to the limiting voltage. This again reduces the capacity of the cell as it cannot be discharged farther than the lowest plate, without danger of sulphation. If charging is continued long enough to bring up the refractory set of plates, the high set will suffer the consequences of a prolonged overcharge, with the danger of boiling and excessive shedding of active material.

The usual method of testing the relative charge between the two plates is to insert, temporarily, a third plate or electrode made of some metallic substance different in its electrochemical character from the two lead plates, so that a difference of potential is established between both of the plates and the third electrode. The latter element must be negative to the positive lead plate, and positive to the negative lead plate so that current will flow either way from the test electrode to either of the lead plates. A voltmeter is placed in this temporary test circuit, which will give the relative conditions of the cell electrodes.

Metallic cadmium is universally used for the third electrode, a strip about three inches long and one-quarter inch in diameter being sufficient for this purpose. The strip must be free from impurities and must also be covered with a thin coat of oxide before starting the test. Since there is a slight difference of potential between the oxide and the metallic portions of the cadmium electrode, the stick should never be scraped free of the oxide during a test or the accuracy of the determination will be affected. A sensitive voltmeter with a finely divided scale will be necessary (battery type instrument) as the voltage between the cadmium electrode and the negative plate is very low, seldom exceeding 0.35 volts. Only a voltmeter having a high resistance should be used to eliminate errors due to the polarization of the cadmium electrode that occurs when appreciable currents are allowed to flow.



Before taking the readings, the cadmium stick should be allowed to remain in the electrolyte of the cell for a few minutes so that a coating of cadmium sulplate will have time to form on the surface. It should never be removed from the cell during the test as the drying effect of the air will produce chemical changes that will result in inaccurate readings. Carefully avoid bringing the electrode into contact with either of the lead plates. This is usually prevented by covering the stick with a perforated rubber tube, the perforations being numerous enough to allow a quantity of electrolyte to make contact with the stick, and to reduce the resistance.

The tests during the charging period should be made with the battery charging at the normal rate, and readings should be taken both at the beginning and the end of the charge. When starting the charge, with the cell fully discharged, there will be no voltage between the cadmium and negative plates, but as the charging proceeds the voltage will gradually rise until it reaches 0.15 volts or over at the end of the charge. When the difference of potential between the cadmium and the negative plate reaches 0.18 volts, the negative is fully charged. If at the end of the charge it be found that the cell voltage is 2.5 volts or more, between the lead plates, and less than 0.18 volts between the cadmium and negative plates, the charging of the negative plates is not complete.

The voltage relations between the cadmium and positive plates, and the cadmium and negative plates of a fully charged cell will be about as follows:

Between positive and negative lead plates..................	2.50
Between positive and cadmium electrodes..................	2.32
Between negative and cadmium electrodes..................	0.18

It will be noted from the above table that the voltage between the positive and negative plates is equal to the sum of the voltages between the cadmium and the positive plate and the voltage between the cadmium and negative plates, the difference of potential between the cadmium and the lead being due to a shunted portion of the current, proportional to the electro-chemical difference between the cadmium and the sponge lead and the cadmium and the lead peroxide. This fact can be used in the test as a check on the accuracy of the readings, for if the sum of the intermediate voltages is not equal to the terminal voltage, the results are in error, and the test should therefore be repeated.

Since the cadmium is negative in regard to the positive lead plate, and positive in regard to the negative plate, the connections of the voltmeter must either be reversed, or a reversing switch must be placed in the circuit.

Readings obtained by this method are as useful in investigating conditions during the discharge as during the charge. In this case the readings taken from the cadmium and negative plates are in the reverse direction, the negative plates being positive to the cadmium, and the cell volts being equal to the difference between the two cadmium readings. During discharge the voltage between the cadmium and negative plates gradually increases until a limit depending on the rate of discharge is reached. The following table shows the values obtained from a cell on discharge in which both sets of plates were in perfect condition.

			Positive and Negative Plates. volts.	*Positive Plates and Cadmium.* volts.	*Negative Plates and Cadmium.* volts.
10-hour rate	2	minutes	2.07	2.25	.18
	5	hours	1.92	2.12	.20
	10	hours	1.70	1.93	.23
3-hour rate	2	minutes	2.02	2.22	.20
	1½	hours	1.88	2.10	.22
	3	hours	1.70	2.00	.30
1-hour rate	2	minutes	1.96	2.17	.21
	½	hour	1.83	2.09	.26
	1	hour	1.60	1.93	.33

From the table it will be seen that the cadmium readings' varying according to the rate and also the period of discharge, the difference of potential between the cadmium and the negative plates increasing until the limits are reached. If it is found that the final voltage of the cell is reached before the cadmium and negative plate limit is reached, it shows that the positive plates are at fault. Should the cadmium and negative value be obtained first it will prove that the negative plates are at fault.

Baker Electric Makes 250 Mile Tour

C. A. Lamus of the Baker Electric Company tells of his trip from Sacramento to San Francisco and return, in his trusty electric.

"Some people are of the opinion that electric automobiles are merely a town car, and will not go any place," he says. "To those I would say if they had been with me on my trip to San Francisco and return in my Baker electric, they would have been surprised at the ease with which it was done and the ample power the car has in climbing the steep grades.

"The natives along the road stared in open-mouthed astonishment when they saw my little car climbing the grades noiselessly and without difficulty.

"The roads, with the exception of one or two short stretches, were in fine condition, and when the car made the round trip it was as clean as if it had never left Sacramento.

"I arranged to have the car charged at Stockton for a couple of hours, and, from there to Livermore, forty-three miles, over a fine road with some hills, was made in about three hours.

"After leaving the car on charge at Livermore for a little more than an hour, I started on the final lap of the journey. The only steep grade is encounutered here, but, once over the summit, we found a beautiful boulevard into Oakland, where I arrived at 6:40.

"After being over the road once, I found the return trip much easier. The grades were not so steep, and at no time did I find it necesary to use beyond the fourth speed. And at the steepest climb the car was drawing only eighty-five amperes.

"I am quite sure my car could have gone all the way from Oakland to Stockton on one charge, but for safety I gave it a boost charge at Livermore. At the electric garage at Stockton I gave it another charge for about three hours, which was ample to finish the trip to Sacramento.

"The odometer registered 253 miles for the entire trip, which was made without trouble or mishap of any kind. The car was equipped with Goodrich cord pneumatic tires, and I escaped without even a puncture."

Electric Truck's Ability Increases Sales

The adoption of the electric truck by scores of business firms the past year, coupled with the increase of nearly thirty per cent in truck sales in Massachusetts the past four months, has led many business men who have previously paid no attention to the electric type of commercial vehicle, to investigate. It is a tribute to the efficiency of the electric that it has withstood tests which have in many instances been far harder than the actual work to which the truck would be put in service. But in every instance the electric has proven its ability. As a result, the express companies, the breweries, the department stores and other large concerns have given reorder after reorder for electric trucks.

One feature which has made for the success of the electric is the attitude of the manufacturers. In former days, when the batteries were in an experimental stage of development, when the necessity for specially constructed tire equipment was not recognized, electric truck salesmen were prone to make rather extravagant claims for their goods. As a result trucks were sold for duties which were beyond their capabilities. Today many an electric truck salesman spends days investigating the conditions of service to which the contemplated trucks will be put, and then tells the prospective purchaser that an electric truck would not do the work as economically and efficiently as would some other means of transportation. In other words, the sales policy of the electric truck manufacturer is based upon the surety that the conditions are suitable for the truck. This policy has resulted in satisfied customers and in greatly increased popularity for the battery-driven commercial car.

The new scheme of electric truck salesmanship realizes that there is a mileage limit to the trucking problem that the electric will meet, that there are certain road conditions which increase the expense of operation. When these conditions arise, which, it may be said, is seldom, the prospective purchaser is advised not to purchase an electric. In several instances, actual orders have been cancelled by the manufacturer. This system has brought about a stability and confidence in electric truck salesmen which has done much good. The merchant contemplating the purchase of commercial vehicles feels that he will get honest, sincere advice based on the conditions peculiar to his own problem.

The electric salesman can point to thousands of electric trucks in the service of hundreds of prominent firms. The large fleets of the country are practically all electrics. A local express company recently placed a single order for twenty-five trucks for use in Boston. A prominent lumber company in Greater Boston uses but two of the twenty-eight horses it formerly owned, the electric trucks doing all the work the other twenty-six horses did and much more..

The present high cost of gasoline has had its effect upon electric truck sales. The continually decreasing cost of electric current, the increasing number of charging stations, the simple operation, the low insurance rate, the longevity of the electric truck as compared with other forms of transportation, the freedom from fire and explosion and the lack of need of repair has made the electric truck a strong factor in the hauling problem of Boston, and the rapidly increasing number in the city proves the efficiency of the battery-driven commercial vehicle.

The Central Station's Greatest Opportunity

Paper Read Before the National Electric Light Association

BY EDWIN E. WITHERBY

UNQUESTIONABLY, the greatest business opportunity is where one gets the greatest volume of business. You may have an electric flatiron in every house in your territory, a toaster, perhaps a vacuum cleaner, and an occasional washing machine, and some one or two of the many other useful domestic appliances in practically every home, and you smile complacently and look satisfied.

You do not realize as you go from home to the office or return that as you pass the various horse wagons (and there are thousands of them) or the gasoline truck once in a while, that the biggest piece of real business in every man's community is the transportation of persons and merchandise, and that at least 50 per cent of all the tonnage that you see every day can be hauled cheaper by electric vehicles than it can be done by horses or gasoline machines.

If we can do this work by electricity, it is up to the central station man to furnish it, and at such prices as to show a big economy to the one who uses it and to earn dividends for the company. The point I want to bring out is embodied in that old saying—"practice what you preach."

The pleasure car or electric truck salesman has a hard, up-hill job to convince the man or woman who wants, for personal use, a simple and elegant vehicle to buy an electric, or to influence the merchant or warehouseman in the purchase of electric commercial vehicles, when the officers and superintendents of the electric company are all driving around in gas cars and are using horses and gas trucks for the work of the central stations. And let me emphasize the fact that this is not an idle statement; on the other hand, it is the usual condition, I am sorry to say. I am not taking every central station man to task on this—there are a few who realize the opportunity and are honestly trying to help the electric vehicle and in this way help themselves for a big record of increase in business and dividends, but the small percentage of the whole who are helping is what hurts us all—I honestly believe less than ten per cent of all central station men. Is it not time to change your methods and get in line? I know that it is.

Look at the following charts: Figs. 1 and 2 show an average daily load curve of the Commonwealth Edison Company. One is typical of a summer's day and one of a winter's day. Note the change in conditions the electric vehicle load could make if applied as it will be and in the no distant future. I quote from Mr. George Jones' paper read at the Illinois state meeting, "that if half of the horses in Chicago were replaced by electric vehicles, this estimated load amounts to 94,000,000 kilowatt-hours per annum, to take care of which no additional investment in station equipment would be required, and this off-peak output would increase the general load-factor 13.2 per cent."

High class engineers have for years worked to produce apparatus that will give great economies. This is more true in the electric field than any other class of engineering, and they have accomplished something; but the greatest economy has been brought about not so much by change in design as by larger units and better load-factor. In the old days, electric stations operated from dusk in the afternoon until 1 A. M., or perhaps until daylight, with a load-factor of 5 to 6 per cent. A little later we ran our plants 24 hours a day, and with a combined railroad and lighting plant we had a load-factor of

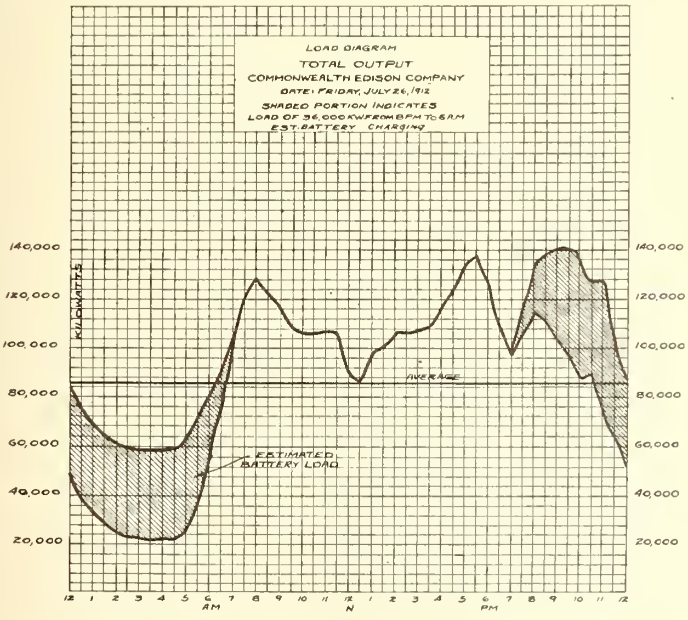


Fig. 1.—Typical Summer Load Curve of Commonwealth Edison Company.

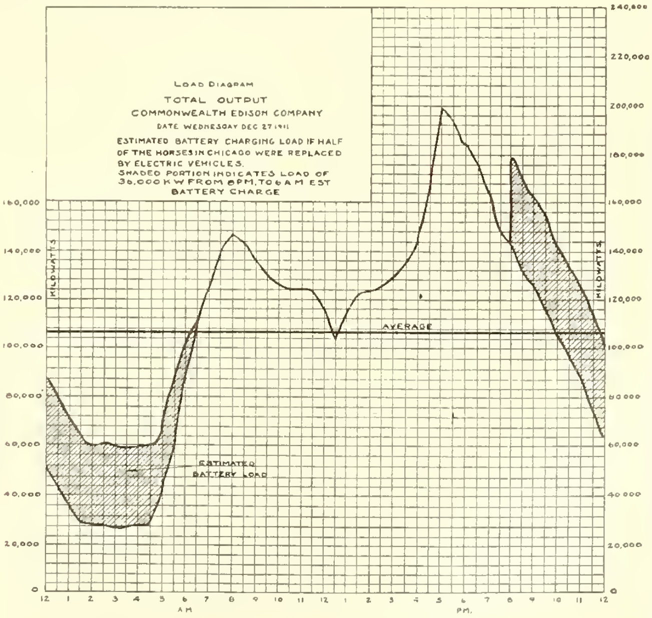


Fig. 2.—Winter Load Curve of Same Company.

perhaps 25 per cent and sold current at 20 cents a k. w. h. Now the universal power in small establishments is the electric motor. Domestic appliances are everywhere. Our generating units have gone from 37½ and 50 k. w. to 15,000 or 20,000 k. w. and now we are soon to see one of 30,000 k. w. installed in the city of Chicago. Load-factor is being improved constantly. We are all looking for the ideal 100 per cent and our chances are good—but how? Most of our power motors are cutting out about 5 or 6 p. m. and starting at 7 or 8 a. m. Our regular residence and commercial load is off the lines by midnight (except in New York), but we cannot turn night into day everywhere and we cannot expect to see the time when all factories will work nights as well as days, for men will not do it. What we must get is a load from ten, eleven or twelve o'clock at night until seven in the morning, and the electric vehicle is the one thing to do it and give the load necessary to flatten out the load curve. And the nearer we get to 100 per cent the lower our cost and the greater efficiency, which means, as stated before, dividends.

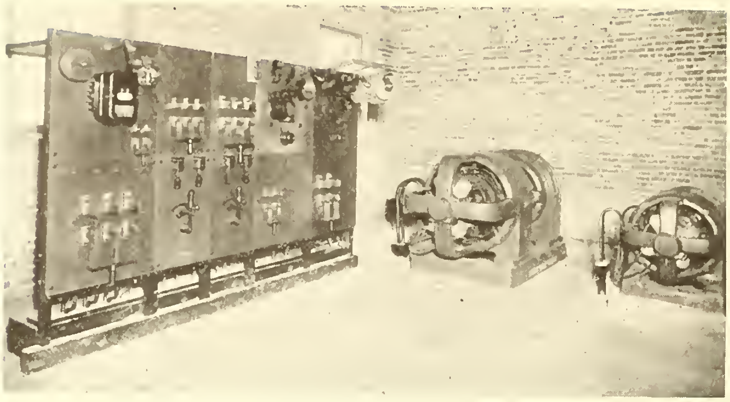


Fig. 3.—Charging Equipment of Elite Garage.

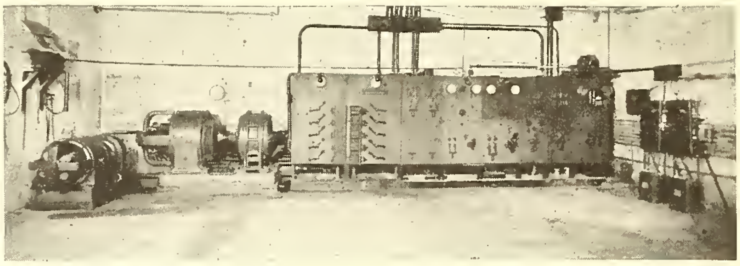


Fig. 4.—Motor-Generators, Rectifiers and Charging Panels of Terminal Garage.

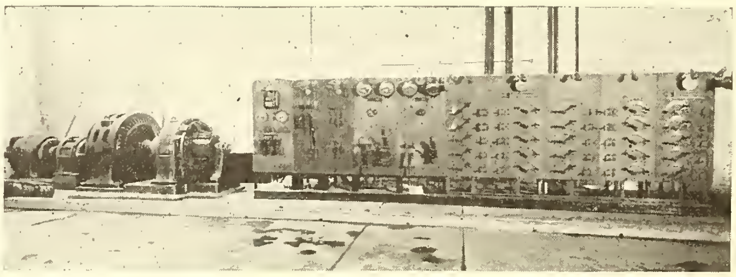


Fig. 5.—Equipment of Carson, Pirie, Scott & Co.'s 61st Street Garage.

You have been thinking so far that I have not proved my case—but I will. The electric vehicle salesman has convinced thousands of ladies that the electric pleasure car is what they want—the central station man did not do it—and thousands of these vehicles are in use today and are here to stay. The electric truck salesman has convinced hundreds of up-to-date merchants and manufacturing companies. The result is that thousands of electric trucks are in use and increase the revenue of electric light and power companies thousands of dollars annually. Now what cooperation and help do we get from the average central station man? I say, emphatically, not a particle. We thank our lucky stars there are some exceptions and the exceptions are the ones that are now getting the greatest return for their help and assistance when we needed it most.

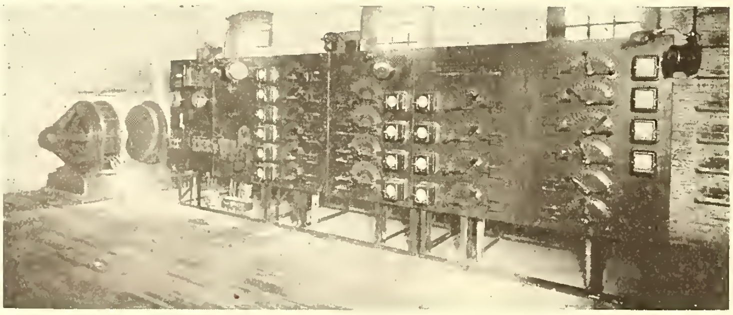


Fig. 6.—Charging Panels in One of the Marshall Field Garages.

To prove up again, look at the illustrations of some of the public garages here in Chicago, as shown in this paper:

The Elite Garage has installed a 25 k. w. and a 75 k. w. motor generator set to take care of one hundred to one hundred and fifty electric cars. The Terminal Garage was a 25 k. w. and two 75 k. w. motor generator sets and two 50-ampere rectifiers to take care of 100 to 180 cars. The Lake View Garage has a 50 k. w. motor generator set and two 50-ampere rectifiers, to take care of 50 electric cars. The private garage of Carson, Pirie, Scott & Company, 61st street, has a 25 horsepower motor-generator set, and one of Marshall Field & Company, 63rd street, a 75 k. w. motor-generator set. Marshall Field & Company will have in all their garages over 1,500 k. w. installed. These are just a few of the newer installations now in Chicago.

The Commonwealth Edison Company has given all help and assistance that is possible, and please note the returns it is getting. Just look at the curve in Fig. 7 showing the monthly consumption of one garage alone and consider this: Over 75 per cent of that load is off peak business, and that is the load you all want.

Quoting further from Mr. Jones' paper: "In Fig. 8 there is shown a daily load curve of a prosperous modern electric garage taking care of from 60 to 75 pleasure vehicles. This garage is being operated by central station current and under a "limited hour" contract which permits it to do charging at any time of the day during the summer months, but during the winter months it is not permitted to do charging during time of "peak hours" of the central station, namely, between the hours of 4:00 and 8:00 p. m."

A garage for commercial trucks would have a somewhat different curve, as a heavy load would be put on at

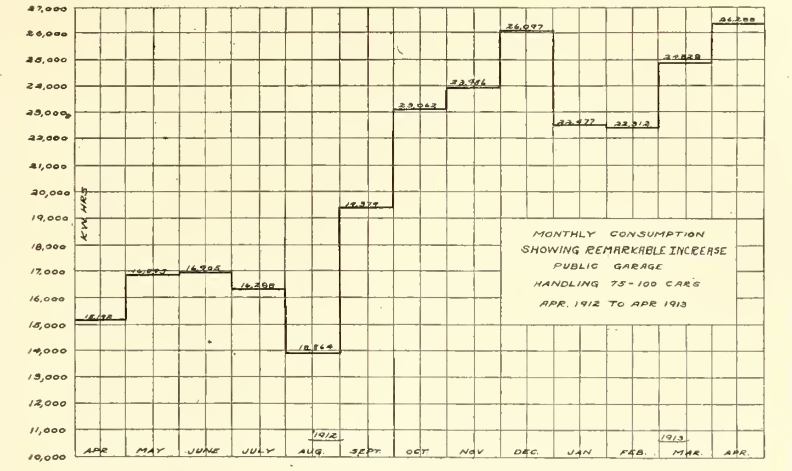


Fig. 7.—Variation in Monthly Consumption of a Public Garage.

about eight o'clock, as shown in Fig. 9, and continue more or less steadily throughout the night.

Then, too, a considerable load will be built up at noon for "boosting" and, by the way, this offers about the only means by which we can hope to fill in the heavy noon hour depression in the daily curve of all large central stations.

I will admit that you are not all operating plants in cities like Chicago, but you can all have your proportion if you will work for it. As an example of the operation take one of our department stores here in Chicago, which has in use and on order 139 electric commercial cars, and has installed and on order 1,500 k. w. capacity of charging apparatus. Curve Fig. 10 shows the amount of current furnished this company for charging purposes alone, and please note the shape of the curve. Is it not a surprise to you to realize that one consumer pays for 390,000 k. w. h. in one month? This same department store has a number of electric vehicles on order now and is preparing to add still more. The curve in Fig. 11 shows just how rapid this increase has been. In Fig. 12 the daily load curve of a similar department store garage is shown, illustrating again the off-peak nature of these loads.

Now another fact: In the city of Chicago there were in use in

Nov., 1910..... 80 electric commercial trucks.
Nov., 1911.....150 electric commercial trucks.
Apr., 1912.....263 electric commercial trucks.
Nov., 1912.....365 electric commercial trucks.
Jan., 1913.....523 electric commercial trucks.
May, 1913, 647 electric commercial trucks

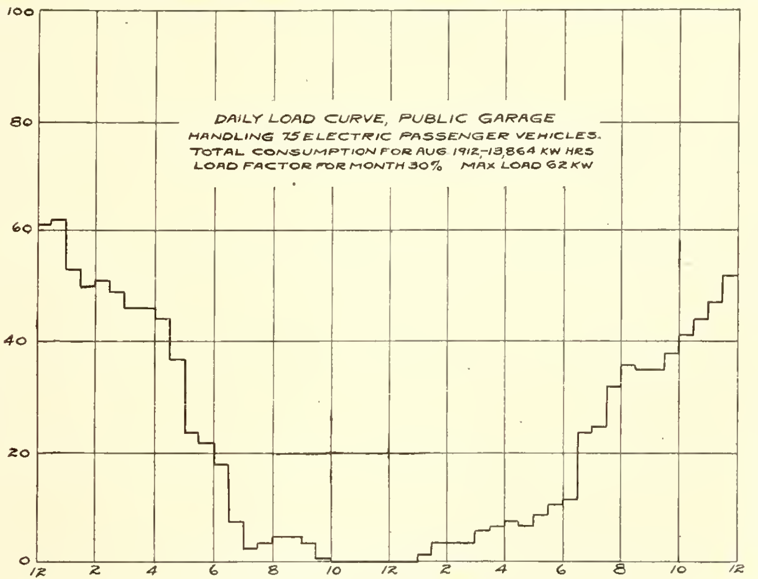


Fig. 8.—Daily Load Curve of a Prosperous Garage.

As the saying is, "that's going some," and the live combinations in this city are hoping for a thousand by December 31, 1913. While some of us are working for trucks all the time, some others are just as hard at work on pleasure cars. While the pleasure car is exceedingly popular with the ladies, the business man is putting it to a broader use to meet his requirements around the city, as the electric is the only really practical car for city use.

Some ten years ago I was the owner of a couple of electric cars—a runabout and a surrey—and being a central station man supposed I should know all about them because they were electric. I had a lot to learn and it was expensive. Current for charging cost 15 cents per k. w. h. at first, and later 12 cents. Today, in most places, you pay 10 cents, if you keep your car at home. But in Chicago, in public garages, you pay from 2 to 6 cents, depending on quantity.

A great many central station men with small plants look upon the electric vehicle as something that should be shunned and not encouraged.

First we had a pleasure car, then light trucks, and finally heavy electric trucks up to 12 tons capacity. Great improvements have been made in batteries and greater improvements from an engineering standpoint in the construction of electric vehicles and pleasure cars. The result is that we have a vehicle for any class of work desired and each one is, respectively, the best for its class of work; the light, quick delivery, with ease of control, quick to act and good speed; the medium in weight and speed; and the heavy 5 or 7 ton with its safe and sane speed, that is always ready to do the work required—a large enough line to fit any class of business and a type for every purpose.

Chicago electric interests have been in favor of electric vehicles for years and are using them to the exclusion of other types of vehicles; Boston has always been a strong advocate; Philadelphia and St. Louis have pushed the electric vehicle constantly, and recently the New York Edison Company has come very strongly to the front in pushing the electric vehicle, and today in New York City we have nearly 3,000 electric trucks.

The big express companies; the American, Adams, Wells Fargo and others, after a period of try-out of gasoline versus electric cars, go in strongly for the electric car for city service, and it is no experiment with these companies. Extensive investigation, careful checking of results, was what determined the final decision. In five years there will be thousands of electric trucks in this one service. Now why should the electric light and power man hesitate as he is doing?

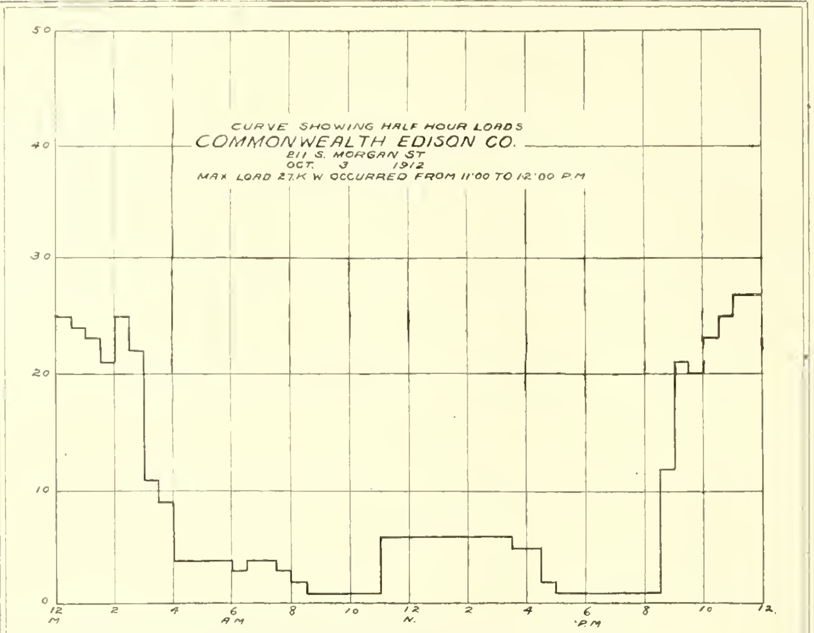


Fig. 9.—Load Curve of Garage Charging Electric Vehicles.

Some of the largest fleets are in the brewery interests, one brewery in New York having 112 electric trucks of large capacity—all of one vehicle company manufacture. And the breweries have not gone into this in a wholesale way without a try-out. They have taken years to test it out. The result is that a representative of one of the largest breweries in New York made a public statement at the Brewers' Congress in Boston, Mass., October, 1912, that the electric trucks were saving his company over $80,000 per annum in delivery service.

Gentlemen, the electric light company in New York did not sell the brewery company that lot of trucks. It was a matter of indifference to them at the beginning, but not so now. The electric light company is on the job every minute, and employs some of the brightest brains and business talent in the country to push the sale and use of electric trucks and pleasure vehicles.

Now if this is good business for New York, Chicago, Boston, Philadelphia, St. Louis, and some of the larger cities, why is it not equally important to every one of you who manage or who are responsible for a generating plant and really interested in its success?

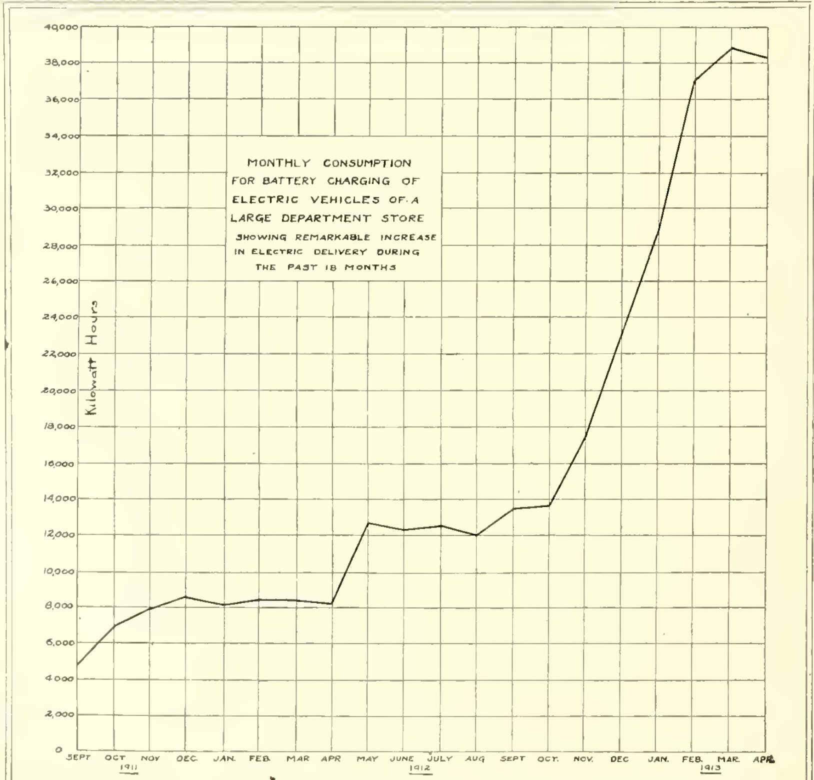


Fig. 10.—Remarkable Increase of Current Consumptian for Battery Charging in a Large Department Store.

A late example is one of our British cousins at Vancouver, B. C., which is starting an active campaign by taking the agency of one of the more prominent electric truck manufacturing company's product, has established charging stations in conjunction with all of its substations, and has put on the best talent that could be found to push this very desirable branch of the electric business, and it is using the electric vehicle in its own service there.

I wish everyone would read the article in the *Electrical World,* issue of May 17, 1913, and see what the Denver Gas & Electric Company is doing. "Oh, yes, that is a Doherty company." Wherever you find a Doherty company you will find every man on the job pushing electric vehicles and, what is best of all, the company is using them at every point. That organization practices what it preaches.

Hartford, Conn., has also become an agent for a prominent truck and is selling current by the can, as it were, on a flat mileage rate, and apparently is a big success.

We could go on and mention a number of others but that is not the point I am aiming at. What I want you all to realize is that I am directly after the manager, the "new business man," the chap who is actually responsible for the sale of current, of every company in this great country of ours. I wonder if the managers of all operating companies realize that the new-business man, the real business getter, is more responsible for reducing costs and increasing revenue than the engineer at the plant in 75 per cent of the operating companies of today.

As a proof, let me state that 25 years ago we were paying $3.00 and $3.50 per thousand feet for gas and 20 years ago 20 cents and 25 cents per ampere hour for electric current. At those periods load-factor on the gas plant was less than 25 per cent and they had the advantage of storage facilities. Electric plants had load-factors of 5 or 6 per cent. Engineering and invention have helped, but energetic business methods that improve load-factor have done more to improve operating conditions and reduce costs than anything else. Why, if load-factor had not been improved we would be paying $3.00 for gas and 20 cents per k. w. h. for electricity, but the hustling business getter has found thousands of ways to use gas and many more thousands of ways to use electricity, with the result that the peak in many plants is in the daylight hours and not 5 to 7 P. M., as in olden times.

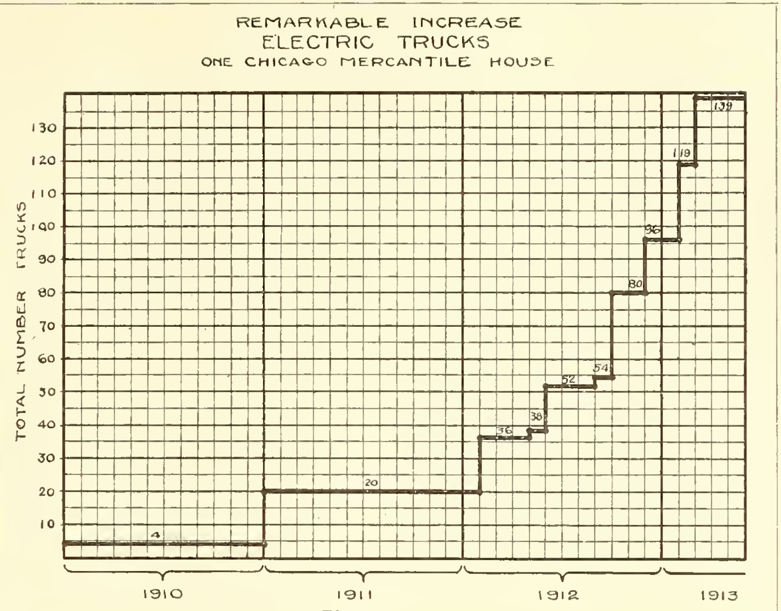


Fig. 11.

In a conversation with the president of a prominent operating company less than a month ago, he sang praises loud and long because they had sold on one flatiron campaign 1,878 flatirons—and the boost to business it was; and this same man will eventually supersede every horse or gas car with the electric vehicle for the various uses of his company. He is consistent and will help the whole country by his example, having just purchased 12 more electric trucks for his company.

It is easy to figure what flatirons, cooking and heating appliances and many other things are going to do to help our load-factor. Motors for power, while long hour business, lap over and increase our peak and in a great many cases increase our investment charges, but current for charging electric vehicles is off-peak business and the "one best bet" for fairly large blocks of power, and at a time when the load curve is the lowest.

Because I was in the operating end for over twenty years is the reason I feel that I can see both sides of the question; and I know that more than 60 per cent of the men in charge of properties will not do the first thing to help push the electric vehicle. I know of one place where an express company installed some electric trucks but in a few months had to send them away to some other city, because it could not get anyone in the city to take care of them properly, and the electric light and power company in that city is supposed to be up to date in every way. I might add that this company uses gas cars for its own work.

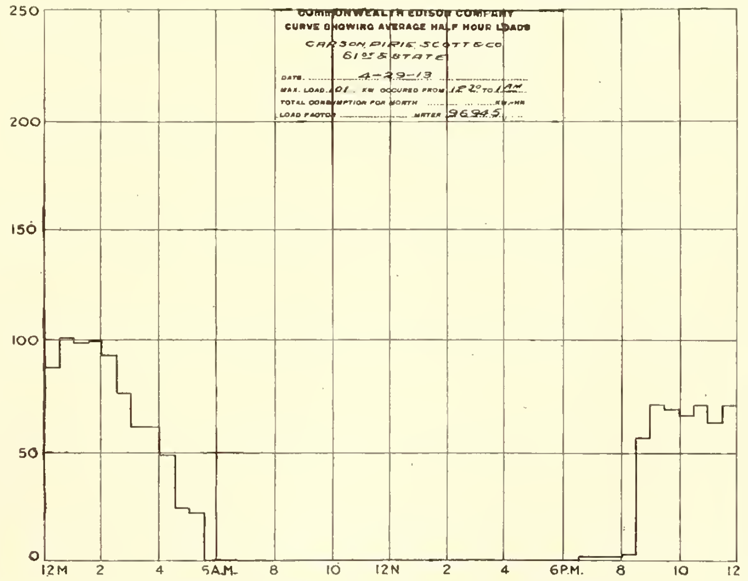


Fig. 12.—Daily Load Curve of a Department Store Garage.

Only last week one of our salesmen wrote from a good-sized city in Ohio as follows: "Mr. W., secretary and treasurer of this company, recently bought a gas truck. He said he had heard a lot about electric trucks but had been afraid to install them, thinking the electric railway, light and power company would have electrics if they were economical and reliable." Gentlemen, this is the example over again. Practice what you preach.

Some of our central station men say that the electric truck is too heavy and will not do our work; it takes too much power to move itself! They do not stop to check up that a 5-ton electric truck, with an up to date battery, will weigh less than a 5-ton standard make gas truck, but it is a fact. That same man will approve of an electric pleasure car that is so built and arranged that it is only carrying one pound of load for every eight to ten pounds of vehicle, while he will hesitate to use or advocate the lighter capacity electric trucks where we have one pound of load for every four pounds of vehicle; and on the 5-ton electric truck we just about balance a pound of load for a pound of complete vehicle, so when we come to real efficiency, we excel in the larger capacities. And 5-ton trucks will use current on an average, if worked to full capacity of load and mileage, 900 k. w. h. per month or 10,800 k. w. h. per annum, or in round figures $450.00 to $500.00 per annum current cost. Now, suppose you have one hundred 5-ton trucks in your city at $500.00 per annum, that means $50,000.00 added to off-peak business without a dollar of increase in investment, no more for labor or depreciation, only added cost of coal, water, and oil. This, I believe, proves what I have said at the start. You are overlooking the one best and biggest thing that it is possible to get.

When the time arrives that it is impossible for a central station manager to see a wagon load of merchandise passing on the street without mentally translating the impression into terms of dollars and cents, revenue from off-peak load, then he will get busy on promoting electric vehicle activities. At the present time most of you are traveling in the rut of old methods and this business is going by you in streams every day without suggesting to you that it is and should be your business.

In 1910 the railways transported, exclusive of duplication of interchange of freight, 1,026,491,782 tons. Included in the total are manufactures, 278,157,500, miscellaneous, 71,600,523, stone and sand, 98,861,000, anthracite coal, 117,480,501, animal products, 38,624,775, merchandise, 61,234,757 tons. In transporting this tonnage the railways are using 2,350,000 freight cars, the average load per car was 22.3 tons and required 66,000 locomotives.

It would be interesting to know just what percentage of the total tonnage was of necessity hauled to and from freight terminals. Possibly 25 per cent of it was trucked twice, perhaps four times, between the point of original shipment and ultimate destination.

Suppose you should translate these possible ton miles of truck hauling into terms of k. w. h. and then into dollars of revenue? Why, the amount would seem like a dream; but it is a possibility, and it is slowly but surely coming. Now let us all try to get some of that revenue while we are here, not leave all of it to the future generation.

The electric vehicle salesman or the manufacturing company he is working for cannot do it all. In a way we are working for you. We hope to get a sales profit, but you get a continuous profit on the sale of current and of the most profitable kind. Now will you help, will you do your part as honestly and consistently as we have done ours? And we have been at it steadily, forging ahead for ten years—a hard uphill fight. We have convinced the live merchant, the big express companies, the entire brewery industry—but the average central station man is still to be shown the light of day.

Greater Battery Capacity Popularizes Electrics

"Few people realize how popular the electric vehicle is becoming in San Francisco and the other large cities of the Pacific coast," says Samuel N. Crim, the head of the Reliance Automobile Company, agents for the Detroit electric vehicles.

"This is all due to the fact that the electric vehicle has been greatly improved in the last two or three years, and especially so in the last 12 months.

"The two most prominent factors that have helped to increase the popularity of the car are the greater battery capacity, which means greater power, and the increased speed of the vehicle.

"There is no question but that if the electric car would generate speed as quickly as the gas car, it would be the most popular vehicle of today; but to the present time this speed has not been obtained, although a marked improvement over that of a season ago may now be noted.

"The electric vehicle is ideal for women. They can travel just as fast as is necessary or safe. There are many cases where women have shown their ability to handle a gas car. But even to them the electric car is most desirable, inasmuch as it is cleaner and less likely to get out of order.

"One has but to look over the registrations at Sacramento to see the increased popularity of the electric vehicle. There is no question that the day is coming when every household will have in its automobile stable at least one electric vehicle for the use of the women folks. And it is certain that the time is not far distant when the business men who have to cover short distances in the congested traffic districts of this city will own some sort of an electric vehicle."

Says Electrics Will Rival Gas Cars

"It is not a stretch of the imagination to say that electric vehicles will, in four years, be as popular as the gasoline vehicle today," says T. H. McGiehan, general manager of the Motz Tire and Rubber Company, Akron, Ohio.

"With the coming of good roads and the standardization of batteries, it will be no unusual thing for owners of electric tire vehicles to make long tours. Trips over 100 miles in length are being made today on one charge. Already charging stations have been placed at intervals along many of our highways so that car owners are enabled to obtain recharged batteries, just as you obtain gas tanks.

"The car owner would, of course, dislike to exchange an empty set of good batteries for a recharged set of inferior ones. So the electric vehicle industry is bound to come to standardized batteries. It is not at all improbable that electric car owners may be enabled to get canned electricity just as easily as you can get canned light now.

"Conservation of power is, of course, the main factor in the maintenance of an electric car. Few people realize the bearing tire efficiency has upon the saving of the battery charge. Every time a solid tire strikes a road obstruction, such as a stone, it takes added power to lift the car over it. But when the tire absorbs the shock, all the power is used in carrying the car in an onward instead of an upward direction."

Milwaukee An Electric Car City

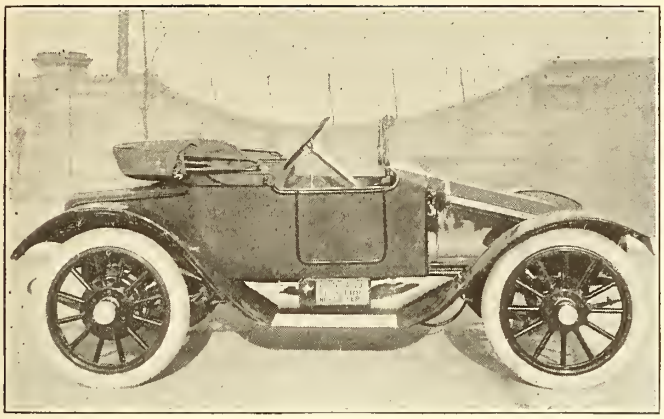
"Milwaukee lays claims to being one of the best electric cities in the country despite the fact that conditions are none too favorable toward the use of vehicles propelled by electric motors," says A. C. Hoppe, of the Smith-Hoppe Auto Company, 215 Wisconsin street, dealers for the Detroit Electric car.

"Sale of electric cars comes partly from bad weather, as well as good weather. Motoring has taken so deep a hold on the gasoline motorist that he no longer stops running when cold weather sets in, but is buying an electric car rather than paying almost an equal amount for a good stylish limousine body for his gas car.

"The activity of the manufacturer has shown itself in the more general production of closed body types, enlarging the brougham style and redesigning them so that all passengers face forward."

Waverly Electric in Parcel Post Field

The Indianapolis parcel post problem is at present rapidly being solved with the aid of a Waverly. This light, yet fast and long-winded little vehicle will in all probability be depended upon ultimately to handle the bulk of parcel post matter within the city limits. With a definite route, with many stops, to cover each day, comparable to the beat of a regular mail carrier, it is predicted that its simplicity of operation, and low cost of maintenance, will give it preference over other types of vehicles. The preliminary work which the car is doing in actual service would seem to justify this claim.



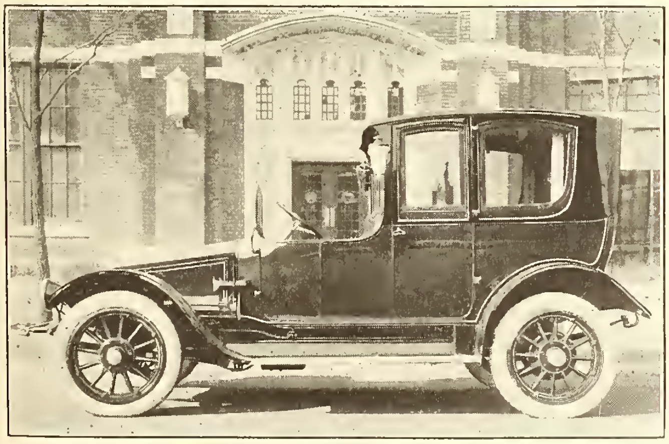
The Borland Coupe.

Borland Electrics for Men

Electric car manufacturers are doubtless themselves most to blame for the prevailing sentiment that the electric is a woman's car. There is no foundation in fact that the electric is not quite as serviceable for the business and professional man as for women. In the three widely different models illustrated here, the Borland-Grannis Company of Chicago has designed cars that are adapted to the three principal requirements of car owners.

The Borland Roadster.

The Borland coupe affords a closed type adaptable to general use, where it is preferred to dispense with a chauffeur and where weather variations make the closed car most practical. Seating five passengers, with either forward or rear drive, this coupe affords an ideal car for all around family use and for the business and professional man who wants year around serviceability at decided economy.



Borland Seven-Passenger Limousine.

But some prefer an open car, provided with top and curtains for inclement weather. The Borland roadster, seating two, provides the low, rakish lines of the popular types of gas cars with all the superior features of the electric. At the same time this roadster allows a higher rate of speed than the coupe model.

In the Borland limousine, seating seven passengers, the manufacturers have dared to be absolutely unique in designing a car that, for beauty of lines and luxuriousness of appointments, leave nothing to be desired. With an extra long wheel base of 123 inches, the utmost comfort on rough roads is assured. This car provides a model for the ultra-fashionable who prefer to be driven by a chauffeur and still enjoy the cleanliness, silence, luxury and simplicity, besides the economy of upkeep and operation, so distinctive of the electric.

Dayton Circular Gives Electric Car Data

Folders, containing information of importance to those interested in electrical cars, were issued at the recent automobile show at Dayton, Ohio, where a number of electrical vehicles were on display. The folders were put out by the Dayton Power and Light Company and comprised pointers on the advantages of the electric vehicle, a schedule of rates for private charging service at Dayton, information as to the local public garage service and the names of Dayton's one hundred and thirty electric car owners with addresses and makes of cars.

For private-garage charging service the Dayton company's rates are as follows, a readiness-to-serve charge of $5 per month being made as the minimum:

Up to 100 kw-hr	$0.0660
101 kw-hr. to 285 kw-hr	0.0635
286 kw-hr. to 714 kw-hr	0.0615
715 kw-hr. to 1,428 kw-hr	0.0560
1,429 kw-hr. to 2,857 kw-hr	0.0540
2,858 kw-hr. to 4,285 kw-hr	0.0460
4,286 kw-hr. to 5,714 kw-hr	0.0388
5,715 kw-hr. and above	0.0315

A discount of 5 per cent is allowed if account is paid within the discount period.

Another page of the folder directs attention to the advantages of electric over gasoline vehicles under heads as follows:

Economy of Money.—1. Greater simplicity, hence fewer repairs. 2. Lower cost of insurance. 3. More durability than reciprocal type. 4. Less care. 5. No elaborate repair tools. 6. Small loss of power. 7. No need of experienced chauffeur, who must get high wages, with small number available. 8. Freedom from insurance limitations.

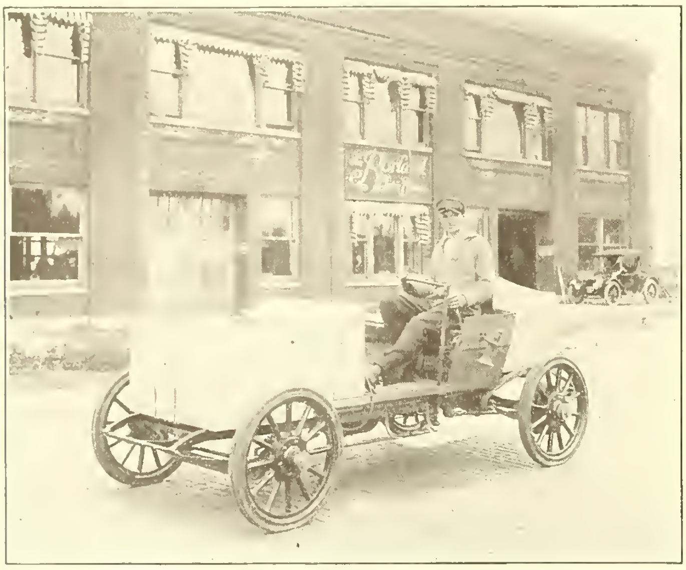
Economy of Time.—1. Simplicity of adjustment. 2. No cranking. 3. Instant readiness. 4. Develop power despite conditions of weather. 5. Less time in repair shop.

General.—1. Simplicity of construction. 2. Simplicity of operation. 3. Danger of fire or explosion eliminated; hence wider field. 4. Universality of electric power. 5. No freezing. 6. No tanks to leak. 7. Electric vehicles permitted on docks and terminals where gasoline vehicles are not allowed. 8. No noise. 9. No odor. 10. Advertising feature. 11. Does not spot liveries with grease, or impregnate goods with odor.

Long wires of small diameter introduce resistance into the circuit and reduce the flow of current. If the circuit must be long, use a wire of generous cross-section, for the small increase of cost is soon repaid by the saving in energy.

"Chassis Test" Used by Borland

That it pays to be hypercritical of one's own proposition before it is submitted to the general public is a good, sound commercial axiom that is being practiced constantly in the construction and engineering departments of the Borland-Grannis Company, maker of the Borland electric. The scrupluous supervision of each detail of the mechanical construction of every Borland reaches its climax in what is called, by the Borland factory men, the "chassis test." This is something more than a mere factory floor or theoretical test of the chassis. It is an actual road test; a run of 75 to 100 miles under varying conditions of road and weather.



A Borland Chassis Test.

As soon as it is ready, each Borland chassis is turned over to an expert mechanic for the tryout. A crude but serviceable testing body is attached to the chassis and the mechanic, with eye, ear and sense of touch keyed up to the highest notch, literally puts the Borland chassis "through the paces" looking for flaws. There may be a loose bolt here; a slightly warped screw-thread there; something or other that is not working just smoothly enough which a layman or even an experienced automobiltist would never notice. The "man on the box" of the Borland chassis, however, is there to detect imperfections and hence, when he pronounces the chassis in perfect condition, it is pretty safe to say that it is just as nearly O. K. as it can be.

To the sales department of the Borland Grannis Company this "chassis test" is a very valuable, if intangible asset. The cars are in such smooth, frictionless working order when delivered to a customer that "comebacks" for adjustments and complaints about the mechanism, so discouraging to an automobile sales force, are almost unknown to the men who make and sell the Borland.

Electric Climbs Flight of Stairs

Because Miss Rita Stanwood, a pretty young actress, wanted an automobile that "could climb the side of a building," downtown Chicago was treated to a new sensation. Pedestrians on Michigan avenue and guests in the Blackstone hotel were horrified to see a Detroit electric coupe suddenly leave the throng of vehicles in the thoroughfare, and after leaping across the sidewalk, go bumping up the steps of the staid equestrian statue of Gen. John A. Logan, on the lake front. Step after step the car mounted the steep incline, 35 feet high, until its front wheels touched the base of the statue. Then, like the army that Napoleon once led, it "came down again."

At the bottom was a big crowd and a burly traffic policeman, who gathered in the adventurous driver and took him off to the police court. To the judge the prisoner gave the name of E. P. McDonald and said he was a salesman for Detroit electric cars. Asked why he had so boldly disturbed the peace and blocked the traffic, McDonald said, "The sale of this car hinged on its hill climbing ability, and I couldn't find any hill around the city that was sufficiently steep to suit the young lady. It was a case of going up the statue steps or losing the sale. I made a wager I could go up it or I would give her the car."

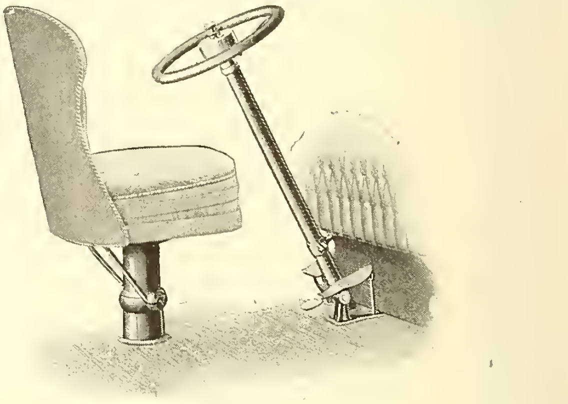
"Did you make the sale," queried Judge Williams.

"I did," said McDonald. "I got the order and the check."

"All right," replied the judge. "The court will divide the commission with you—for disorderly conduct. Better do your demonstrating in the parks hereafter."

Broc Wheel-Steer Foot-Control

The accompanying illustration shows a new and meritorious controlling method now optional on Broc electrics. There is a demand on forward drive electrics for wheel steer with foot speed control in place of wheel or lever steer with hand control, as it is desirable the operator have both hands free for steering. The Broc foot-control is manipulated from neutral or power-off position by tilting the pedal forward to the speed desired. When the desired speed is obtained no pressure on the pedal is required to retain it, and the foot may be removed from the pedal. As the reverse is only manipulated when the car is at a standstill, the reverse lever is located in the center of the wheel, and various reversing speeds are secured the same as forward speeds by means of the foot pedal. To obtain the neutral or power-off position, the pedal is tilted to the rear. A further movement in that direction applies the shaft brake. Rear wheel locking brakes are also furnished.



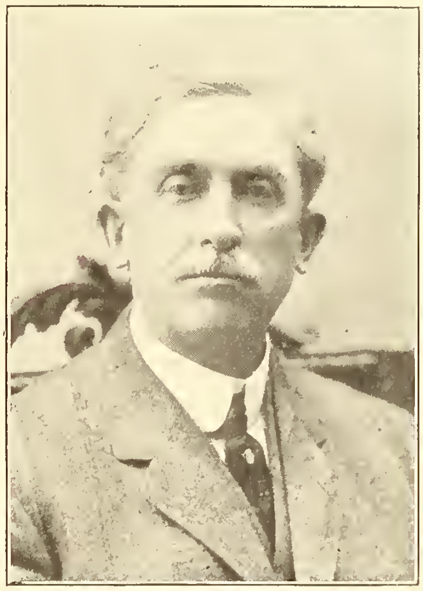
New Foot-Control on Broc Electrics.

A preference is being shown by many purchasers of forward drive electrics for wheel steer, and now that a foot speed control is obtainable that is simple and positive of operation and that permits free use of both hands for steering, the popularity of this Broc model will undoubtedly increase.

Plans for Electric Vehicle Development

Paper Read at the New England Electric Vehicle Convention

BY F. M. KIMBALL



F. M. Kimball.

VERY great progress in the introduction of the commercial vehicle, particularly, has been made during the past year, and there is every reason to expect still greater activity and progress during the coming year. It seems to me that among the more important objects of our activities are:

First: An effort to popularize the electric vehicle with the small tradesman, the artisan and the family of moderate means—for the electric carriage is a vehicle for woman's use as much as for man's; to develop a demand that can be met by a standardized product that can be built in quantity and, therefore, at a cost which shall permit a selling price more comparable with that of the horse-drawn equipment. I think you will probably agree with me that a greater number of commercial electric vehicles are "made" than are manufactured, at present. More varied and widespread use of standardized types of electric vehicles and quantity production of such types is certainly the "key to success" in this particular direction. In this regard we can well take a leaf from the book of experience of our friends in the gas car business. Those who require heavy trucks and wagons, and those who require special construction, usually can and will pay a price commensurate with the cost of serving their needs, but the grocer, the laundryman, the butcher, and the baker, need simply a reliable, sturdy vehicle of moderate carrying capacity, at an initial cost and annual maintenance and operating charge within the reach of a pocket book none too plethoric. A business built up on the production and sale of vehicles of this character, however, when once established, dealing with large, continuous and duplicate production, can be made very attractive.

Second: Attention should be concentrated on providing a wider distribution of garage facilities which will be available to the class of customers referred to above. Garage service must be prompt, effective, and honestly and fairly conducted. While the use of the mercury arc rectifier and the rotary rectifier has made it possible for the owner of a small pleasure or commercial vehicle to do his own charging, the owner of a commercial vehicle usually lacks the disposition, the time, the knowledge and the means adequately to care for his battery and the inspection and up-keep of the vehicle itself during the first year's use, at least. Improved garage facilities will do much to assist in enlarging sales of the types of vehicles required by tradesmen, and I am rather hopeful that by a suitable campaign of education, livery stable keepers may gradually be induced to add facilities for charging and garaging electric vehicles, so that ultimately adequate service may be found, even in all our smaller towns. Proprietors of livery stables must appreciate that the horseless vehicle has come to stay. It would seem to be part of wisdom for them to recognize the situation and meet the new demand half way. The electric carriage can be garaged and charged in buildings heretofore devoted to caring for horses, with substantially no changes or additions, and in this respect the stable keeper can much more easily provide for electric garaging than for garaging gas cars.

Third: To the central stations we must look for the most moderate rates they can safely adopt. Our larger city stations for the most part are already making rates which are attractive and helpful, but in the case of many of the smaller stations, there is a lack of appreciation of the ultimate gain which will almost certainly succeed the apparent present loss. Rates are frequently held at a prohibitive figure, and only an indifferent service is provided.

Finally, we all manufacturers, owners of garages and central station managers —must strive for economies in our business. Those ever-present conditions of the inefficiency of labor, the high cost of all material used in our industry, and the deadly "overhead" charges, in particular, unite to make the problems of achieving popular prices for vehicles and service a most difficult one. We must always be prepared to "break an egg" before we can make an omelet, but we must be indefatigable in assuring ourselves in advance that we break none but good "eggs" and that when broken, the whole contents of the shell goes into the omelet pan, and that no part falls to the floor.

A Book of New England Tours

"Pastime Journeys for Electric Automobiles," is the title of a 36-page booklet, of convenient pocket size, published for the Electric Motor Car Club of Boston, by F. D. Stidham, 138 Pearl street, Boston, Mass. The tours described are Boston to Plymouth, 50 miles; Boston to Portsmouth, N. H., two routes, 75 and 68 miles; Boston to Lowell, 27 miles; Lowell to Boston via Concord, 40 miles; Boston to Worcester, 44 miles; Worcester to Springfield, 51 miles; Boston to Providence and Newport, R. I., 73 miles. Four maps are shown, each giving several routes. The descriptions mention interesting points en route. An alphabetical list of charging stations in New England is given in addition to those mentioned in the text. Besides the tours, the booklet contains articles on "The Electric Automobile Defined" and "The Why of the Electric Motor Car Club." Manufacturers of cars, batteries, charging sets and tires are represented in the advertising pages.

The price of the booklet is 25 cents. Copies may be obtained of Mr. Stidham, or of the secretary of the Electric Motor Car Club of Boston, O. G. Draper, 39 Boyleston street, Boston.

Electric Motor Club at Boston

At the regular meeting of the Electric Motor Car Club of Boston, Secretary O. G. Draper presented a complete and tabulated statement of the registration for electric vehicles up to June 1, 1913. Comment was made on the rapid growth and development of the electric vehicle service in New England within the last year.

President Day Baker spoke of the work done by the civic committee of the club in helping to defeat the proposed law increasing the fee charged on trucks to $5 a ton per annum in the state of Massachusetts. The bill passed the Senate but failed to pass the House.

It was suggested that members of the club should get in closer touch with representatives of electric manufacturers who call upon electric service companies, that additional data on charging stations might be secured. The work done up to the present time along this line shows that to date there are 201 charging stations in New England.

The recent electric vehicle convention at Boston was brought up and discussed at the meeting. It was shown that the convention was a decided success from the fact that it covered a wide range of territory and was attended by representatives from every branch of the electric vehicle industry, including as it did fifty-six central station men, thirty-eight representatives of electric vehicle manufacturers, thirty-eight representatives of battery and accessory makers and twelve press representatives. Attention was also brought to the extensive advertising that has been done since March 1 in the Boston papers. The next meeting of the club will be held June 19 at Boston, when the topic of tires relative to electric vehicles will be brought up and discussed.

The registration of electric vehicles in New England is shown in Table I:

TABLE I—REGISTRATION OF ELECTRIC VEHICLES IN NEW ENGLAND STATES.

	Passenger	Commercial	Total
Maine	3	3	6
New Hampshire	12	1	13
Vermont	2	1	3
Massachusetts	483	350	833
Rhode Island	13	7	20
Connecticut	213	22	235
Totals	726	384	1,110

The growth in Massachusetts for the year ended May 31, 1913, is shown in Table II.

TABLE II—REGISTRATION OF ELECTRIC VEHICLES IN MASSACHUSETTS.

	Passenger	Commercial	Total
Registrations 1911-12	333	181	514
Registrations, 1912-13	483	350	833
Gain during year	150	169	319
Gain in per cent	45	93.7	62

E. V. A. Chicago Section Meeting, June 17

The Chicago section of the Electric Vehicle Association held its regular meeting June 17 at which the committee for the convention to be held in October were appointed, as follows: D. C. Arlington, W. J. McDowell, Homer E. Niesz, John F. Gilchrist, E. E. Witherby, W. L. Rudd, W. B. Grannis, L. E. Burr, L. E. Wagner and G. H. Atkin. The chairmen of standing committees for the coming year were appointed as follows: Membership, E. E. Witherby; publicity, Henry Farrington; garaging facilities, Ernest Lunn; papers, D. C. Arlington; 1914 show, L. E. Wagner; traffic regulation, W. J. McDowell.

The advisability of an electric truck show in connection with the coming convention was discussed, but it was decided that the time was too short within which to make arrangements for complete exhibits and it was thought that a mammoth exhibit of electric trucks and pleasure vehicles which would be of much more importance than at the present time might be held in 1914.

The Chicago section will hold its next meeting at the Hotel La Salle on Tuesday, June 24, when rectifiers and rheostats will be discussed. Several men prominent in this end of the electric vehicle business will be present and are expected to express their views on the subject.

Chicago Thoroughfares to Be Improved

Chicago car owners, who have balked at paying the annual wheel tax and who have questioned the manner in which the city spends the small fortune which yearly is paid over by the wheeled traffic will not be so insistent in their attacks on the law now that the city has taken them into its confidence and unfolded its plans for the coming year.

The city tells the motorists that it is contemplating the expenditure of something like $600,000 this year and that when the work is completed tangible results can be noted. Instead of doing the work piecemeal, as has been the case in the past, the city will adopt the "through routing" idea—that is, it will connect up sections where good roads prevail instead of repairing one block here and another there.

It is planned to repair 160.25 miles of city streets with the wheel tax money, of which 37.63 miles will be asphalt streets, 13.25 granite block, 63.93 brick, 53 macadam and 42.75 country roads.

In the way of expenditures, $105,000 will be spent for asphalt repairs, $40,000 for granite, $60,000 for brick, $3,500 for cedar, $190,000 for macadam, $10,000 for cinders and $72,000 for oiling of macadam streets.

Palermo, Sicily, Has Six Electric Cars

Six electric automobiles are registered at Palermo, Italy, all of them coupe type. They are of the Italian makes, Fram and Ansonia, and average 35 to 40 horsepower. Of these cars only two are said to be in running order says Consul Hermando de Soto at Palermo.

In the opinion of the principal dealer in Palermo, there is a good field for American electric automobiles in that city, provided the sale is pushed with energy, but it is not likely that an electric automobile will be preferred to a gasoline car as the latter is much cheaper in price. There are no charging stations in that city but it is understood that storage batteries can be charged at the electric-power stations. The price of current sold to consumers, including the government and municipal tax, is 8.2 centimes (1.58 cents) per hectowatt hour.

Reports from the other consular offices in Italy indicated that conditions are not promising for the sale of electric automobiles in that country.

Twelve-ton Electric Tractor and Coal Trailer

The Anderson Electric Car Company, manufacturer of the Detroit electric, has recently delivered to the Murphy Power Company of Detroit, Mich., an immense electric tractor and trailer for the purpose of transporting fuel from the coal yards to the local power plant. This trailer is capable of carrying twelve tons of coal. It is loaded in the coal yards from a hopper so that the time for loading and unloading is about eight minutes. One round trip is made hourly and two or three carloads can be handled per day. The labor for transferring this coal is reduced to a minimum as but one man is necessary for all the work involved.

The tractor has 100-inch wheel base, standard truck construction except that the batteries are carried above instead of underslung. This makes them very accessible and also affords the proper weight over the traction wheels. The tractor is fitted with sixty cells of A-12 Edison battery and has plenty of capacity for this work.

The owners figure a saving of from 12 to 15 cents per ton by using this car over and above the horse-drawn method used previously. They figure the operating cost, and include interest on the investment, depreciation, mechanical and electrical upkeep, body repairs and paint, fire insurance and taxes, driver's wages, current for charging and garage expense.

An illustration of the tractor will be found on another page.

Arsenal Finds Electric Truck Economical

At the Frankford Arsenal, Philadelphia, Pa., a one-ton G. M. C. electric has recently been installed and is now doing the work that formerly required three horse wagons and nineteen men. Records at the arsenal show that these men received pay averaging more than $2 a day, and that the cost of the current required to run the new truck is less than 1 cent per mile, electricity being generated at the arsenal. From these figures the savings being made by this new G. M. C. electric are strikingly apparent.

Prior to the installation of the G. M. C. electric there were four gangs of four men each, and three horse-drawn trucks, with drivers regularly employed in the work of transferring materials in the arsenal grounds. The new truck has replaced the wagons entirely and all but a driver and two men, who now handle the motor vehicle and do the necessary loading and unloading.

The electric truck may be operated with safety in the various buildings where ammunition is manufactured. Each of the main buildings is provided with a ramp, or inclined driveway, running from the street into the building. The truck runs up these ramps with ease and delivers material to the exact spot where it is wanted, doing away with four or five separate handlings of material, which formerly were necessary.

Fashion Chooses the Electric Car

A single shipment of six Silent Waverley electrics, aggregating $20,000 in value, was made one recent week from the Waverley factory in Indianapolis to its branch house in Chicago. The three highest priced cars made by the Waverly Company, viz., Model 98 limousine-five, Model 99 Georgian brougham and Model 100 limousine-four, were on the list, and all but one of the cars were of the full-view-ahead type.

This shows very plainly the drift of fashion in electric automobiles. Large, expensive, low-hung, forward-looking cars—such is the demand from the greatest electric automobile center in the country.

Model 98 and Model 100 are the two most popular types of autos the Waverley Company has marketed this year. Model 99 Waverley Georgian brougham is a distinct novelty in electric cars, first exhibited at the Indianapolis Auto Show in March, and only just beginning to come into its own.

Its most unusual feature is the separation of the rear battery box from the body of the car, which gives the auto a strikingly jaunty appearance. A panel of light-colored cane work is an ornamental feature of the body proper.

Introduces Ice Truck Into California

Four big Baker electric trucks ordered by the American Refrigerating Company of Los Angeles were delivered to the ice company by the Pacific Kisselkar branch.

Three of the trucks were two-ton models for use in retail ice deliveries and one was a 3½-ton truck for wholesale work. The trucks are being fitted with special bodies.

J. Horace Kindel of the Pacific Kisselkar branch, who handles the Baker line of electric vehicles, is very eager to see the trucks in actual operation, as this is the first time that electric trucks have been employed in this class of work in this country. Mr. Kindel is confident that they will be as big a success in this capacity as they have proved in many other lines of work. The constant starting and stopping in the retail delivery work makes the gasoline truck unable to compete with horses for this work, but this consideration does not affect the electric vehicle.

Popular Priced Car Hunts Factory Site

William R. Everett, of Chicago, has been making an effort to interest Peoria (Ill.) capital in the manufacture of a new electric automobile. The machine is as large as any now made, has a radius of approximately 100 miles from one charging of the batteries, and will sell for $1,250. It is of standard construction throughout, and the inventor wants it to be to the electric what the Ford machine is to the gasoline-driven machines.

Mr. Everett has made several of the cars and they have more than realized his claims. He desires to locate a factory in Peoria. The Association of Commerce is investigating the matter.

Indianapolis Has Electric Service Station

The Electric Service Company, under the management of T. H. Watts and W. C. Brooks, has opened a new electric service station at Meridian and Walnut streets, Indianapolis, Ind. It is claimed that this is the first exclusive electric garage and service station to be established in the state. A complete stock of parts for all makes of batteries for electric vehicles and also for all makes of starting and lighting outfits. Mr. Watts states that they will also be able to garage a limited number of cars.

Three and One-Half Year Old Battery, Not Car

In the last issue of Electric Vehicles, reference was made to the remarkable run made by a Baliey roadster, which, it was stated, was three and a half years old. We are informed, however, that the car itself is of very recent development and that the Edison battery with which it is equipped is three and a half years years old—which after all, speaks just as well for both car and battery.

The high price of petrol (gasoline) is attracting attention in London. This is advantageous to the sale of electric motor cars, and it is evident that they are coming into extensive use for shopping, calls, the theater, and drives about town.

Delivers Car Seventy-Five Miles

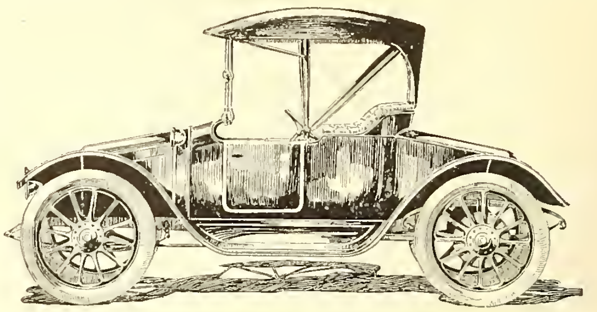
J. L. Hall, who handles the electric car end of the business for the Detroit company at Philadelphia, delivered a four-passenger forward drive electric to Mrs. J. E. P. Holland at Bloomington, Ind. This car was driven by Mr. Hall the entire distance of over 75 miles in six hours over some of the worst hills in the state. Automobile enthusiasts who have toured that section can vouch for the condition of the roads between Martinsville and Bloomington via Gosport, Stinesville, etc.

Such performances are of the greatest importance, as the electric car is now coming into its own very rapidly, and people who are interested will be glad to know that they can make country runs of 30 to 40 miles, and be sure of getting home.

Whipple Has a "Made-Over- Electric Business

Chicago has one business that, so far as known, is the only one of its kind. It is the exclusively used electric car business opened by D. E. Whipple of the Anderson Electric Car Company at 61 East Twenty-fourth street, which is in charge of E. F. McDonald. Electric cars of all kinds and models are bought in all parts of the United States, brought here, rebuilt and new batteries installed. The entire first floor of the Fowler Lamp and Manufacturing Company is occupied by this new business.

When adding electrolyte to that already in a battery cell to make up for the evaporation loss, use a very dilute solution of acid. Evaporation increases the density of the electrolyte and more acid only increases the difficulty.



This Electric Roadster
With Its Unique Lines

Appeals strongly to those who prefer the open type car with the superior features of an Electric. Business and professional men — and the women too — are delighted with the rakish, snappy lines of this Roadster.

The Borland Electric

is made in five popular models, a range of selection that will answer every individual requirement. In justice to yourself, before making a selection of your Electric, you should make it a point to see the superior features of the Borland models.

Handsomely Illustrated Catalog on Request

The Borland-Grannis Company
Chicago Retail Offices, 2634 Michigan Ave.
Factory 310 East Huron Street, Chicago
Standard Equipment, "Exide" Batteries

Personal Items from the Field

Denise Barkalow of the Electric garage at Omaha, Neb., states that practically all of his old customers will be using his service again from now on. The Electric garage reopened for business on May 15 and some owners had arranged for the entire month of May for other service, but June 1 found them back at Fortieth and Farnam streets. Two second-hand Baker electrics and two second-hand Detroiters were sold by the Electric garage one recent week. These cars went through the tornado and former owners purchased new cars.

D. E. Whipple of the Anderson Electric Car Company's Chicago office has established a department for the purchase of used electric cars of all models and makes. Here they are rebuilt and equipped with new batteries.

R. W. Cook, manager of the Peerless Motor Car Company's Philadelphia branch, has taken the agency for Rauch & Lang, and believes that Philadelphia is going to become an "electric city." In the past this city has failed to give the electric car its due, but under Mr. Cook's management these cars are rapidly making homes for themselves in the Quaker City.

T. H. Watts and W. C. Brooks have opened a new electric service station at Meridian and Walnut streets, Indianapolis, Ind.

C. B. Henderson, sales manager of the pleasure car department, and G. H. Kelly, sales manager of the commercial cars for the Baker Electric Company, made a canvass of the state which resulted in the representation of Baker cars through the Kissel Kar agency, throughout California.

William R. Everett of Chicago has evolved a "wonder car" which will sell for $1,250. He is arranging for a factory site in Peoria, Ill.

John H. Eagal, of many years' automobile experience on the Pacific coast, has been appointed manager of sales of both the pleasure and commercial types of Baker electric cars in the state of California.

F. C. Gibson, the man who sold Portland, Ore., its first electric car, is head of the newly opened Gibson Storage Battery Company and the Gibson Electric Garage in Portland. Associated with him is A. E. Foss, who formerly was superintendent of the Studebaker Corporation's factory branch at Portland.

J. L. Hall, who handles the electric car end of the business for the Archay-Atkins Company, Indianapolis, delivered a Model 42, four-passenger, forward-drive Detroit electric to Mrs. J. E. P. Holland at Bloomington, Ind. This car was driven by Mr. Hall the entire distance of over seventy-five miles in six hours over some of the worst hills in the state. Automobile enthusiasts who have toured this section can vouch for the condition of the roads between Martinsville and Bloomington via Gosport, Stinesville, etc. Taber hill, out of Gosport, is so steep that it is a hard proposition for even high-powered gas cars to negotiate successfully. For some time it has been a saying that the check for the car being demonstrated was at the top of Taber hill, and many deals have fallen through owing to the inability of the car to take the hill. This hill was included in the trip.

Ralph C. Jones, well known in the electric automobile field, has been made assistant sales manager of the Century Electric Company at St. Louis. For the past two years he has been the St. Louis representative of the Hupp Yeats electric.

Mrs. Lillie L. Cabanne has joined the sales force of the Ohio Electric Sales Company, St. Louis distributers of the Ohio electric.

T. J. Moss, St. Louis agent for the Borland electric, has added the Standard electric to his line and has placed what he thinks the largest individual order for electrics that has ever been made in St. Louis. Louis Goodheart, district manager of the Standard Electric Car Company, consummated the deal. Mr. Moss also announces that Ralph C. Jones has accepted a position with his company.

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ELECTRIC VEHICLES

Vol. 3 CHICAGO, JULY, 1913 No. 7

ANDERSON ELECTRIC CAR COMPANY'S DETROIT BROUGHAM

Welcome for the New Book

Bailey Boosts the Baby

June 3, 1913

ELECTRIC VEHICLES, Chicago

I have looked over with much interest the first number of *ELECTRIC VEHICLES* and congratulate you on its appearance, which marks an epoch in the history of the Electric Automobile and indicates the great progress which has been made. * * *

S. L. BAILEY & CO.
By J. S. Codman, *Vice-Pres. and Gen. Mgr.*

Rauch and Lang Throw Bouquets

June 10, 1913

ELECTRIC VEHICLES, Chicago

The first issue of your intersting magazine has reached the writer's desk. It is very entertaining and attractive, and should find pioneering the Electric Vehicle into the minds of the laity an easy matter. * * * *

RAUCH & LANG CARRIAGE COMPANY
A. C. Faeh, *Advertising Manager.*

Chicago Electric Likes It

July 10, 1913

ELECTRIC VEHICLES, Chicago,

* * * We wish to compliment you upon your magazine and can assure you we find the reading matter of great interest. * * *

CHICAGO ELECTRIC MOTOR CAR CO.
Penrose Reed, *General Sales Manager.*

Baker Company Shows Appreciation

June 11, 1913

ELECTRIC VEHICLES, Chicago

We want to compliment you on the appearance of the first issue of *ELECTRIC VEHICLES.* It impressed us very favorably. * * * *

THE BAKER MOTOR VEHICLE CO.
By E. L. Colgrove.

General Vehicle Company Shows Desire to Help

June 19, 1913

ELECTRIC VEHICLES, Chicago

* * * We hope to be able to do a little advertising in *ELECTRIC VEHICLES* this fall. * * * The writer will recommend using *Electric Vehicles* in his 1914 recommendations.

GENERAL VEHICLE COMPANY
F. Nelson Carle, *Advertising Manager.*

G. V. Boston Office Boosts

June 5, 1913

ELECTRIC VEHICLES, Chicago

Please send us, if possible, one dozen copies of your May issue of *ELECTRIC VEHICLES.*

DAY BAKER, *District Manager.*

Argo Company Wishes Success

June 11, 1913

ELECTRIC VEHICLES, Chicago

* * * We thank you very much for copy of the first issue of your new publication, in which we wish you the greatest of success. * * *

ARGO ELECTRIC VEHICLE COMPANY
By Allen Jackson.

Boston Motor Car Club Offers Congrats

June 12, 1913

ELECTRIC VEHICLES, Chicago

Congratulations on the May number of *ELECTRIC VEHICLES.* * * * *

O. G. DRAPER, *Business Secretary*

New York Edison Company Lines Up.

June 16, 1913

ELECTRIC VEHICLES, Chicago

This is to advise you that I am today asking that a requisition be drawn for a year's subscription to *ELECTRIC VEHICLES.* Permit me to thank you for the splendid write-up you have given the Electric Vehicle Association in your May issue and to compliment you on the excellency of the entire number.

ARTHUR WILLIAMS, * *General Inspector.*

* Mr. Williams is also President of the Electric Vehicle Association of America.

Standard Electric Car Company Shows Interest

July 12, 1913

ELECTRIC VEHICLES, Chicago

* * * The writer has had the pleasure of looking through the last two issues of your magazine and wishes to compliment you on the general excellence of the same. * * * We are very desirous of having our district managers get in touch with your publication and would like to see them receive copies monthly. They are as follows: * * * *

STANDARD ELECTRIC CAR COMPANY
Fred S. Morgan, *Sales Manager.*

Borland-Grannis Company Shows Its Spirit

June 7, 1913

ELECTRIC VEHICLES, Chicago

Please call at our office for Borland-Grannis ad copy to appear in your July issue.

WM. D. McJUNKIN ADVERTISING AGENCY

Published Monthly By
ELECTRICITY MAGAZINE CORPORATION
Monadnock Building
CHICAGO

Entered at Chicago Post Office as Second Class Mail Matter

ELECTRIC VEHICLES
WITH WHICH IS INCORPORATED IGNITION
TRADE MARK REGISTERED IN THE UNITED STATES PATENT OFFICE

SUBSCRIPTION PRICE
Domestic - $1.50
Canada - - $1.75
Foreign - - $2.00

FOR SALE AT ALL NEWS STANDS

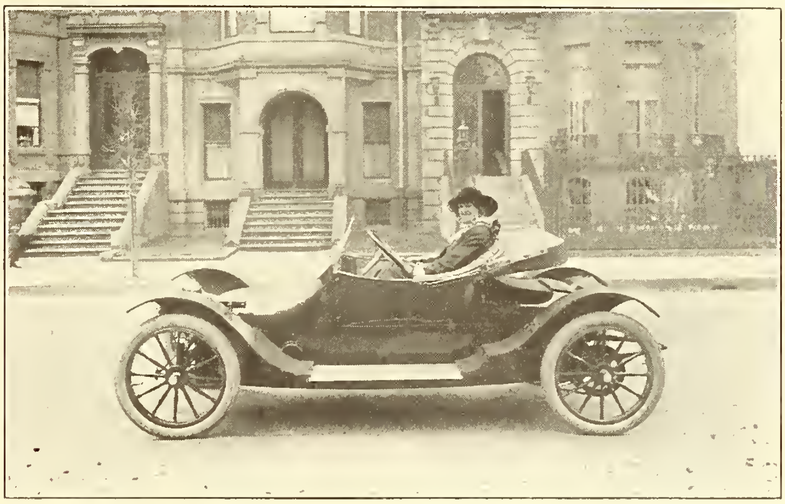
If Your News Dealer Will Not Supply You—Please Notify Us

Volume III CHICAGO, JULY, 1913 Number 7

English Electric Pleasure Car in 360 Mile Run

The London "Electrician's" Representative Describes the Trip

BY W. E. WARRILOW



That Cute Little Bailey Roadster.

MANY thousands of electrically-propelled storage-battery vehicles are in use today in the United States. Under these circumstances, it is high time that something was done in Great Britain with a type of vehicle which is essentially dependent for its successful operation upon the comparative shortness of the distances between towns and cities. If long-distance runs can be made by electric battery vehicles in the United States, where there are wide stretches of open and frequently barren country between towns in which an electricity supply is available, surely something can be done in Great Britain, where the conditions to be met with are exactly the reverse. If only for the fact that our roads are far superior to those in the United States something should be done with the electric vehicle.

In the light of these interesting facts we were glad to have had the opportunity of supervising the trial run of an all-electric vehicle from Scotland to London, which was made at the suggestion of the Edison Storage Battery Company. This run was successfully carried out, and occupied a period from start to finish of 2½ days. This time included resting for one night, and stopping, charging and re-starting at a number of towns at which electrical energy was available through the courteous, not to say enthusiastic, co-operation of the various central station engineers. The charging cables were connected to the car with a minimum of delay, and the run of 360 miles was completed without any breakdown whatever. The car was driven throughout the journey by M. E. Fox, of the Edison Storage Battery Company, and he was accompanied by the writer, who made a number of observations of the running of the car during the trip. We now propose to give a somewhat detailed account of what we consider is an historic event in electric automobilism, and from the data which we now publish it will be seen that vehicles of this type have a distinct economic aspect, which thus tends to enhance their utility and value to users of motor-driven vehicles, whether for commercial or pleasure purposes.

THE ROUTE.

The principal circumstance which governed the selection of the route was the fact that the car was at the Arrol-Johnston works at Dumfries, and was required in London for a parade of electric vehicles which was to be made at Kingston-on-Thames at the conclusion of the paper read by Messrs W. H. W. Watson and R. J. Mitchell. Rather than bring the car to London by rail it was decided that the journed should be made by road, and a suitable route was accordingly considered. As the car is a town vehicle, and has an essentially low gear, it was not possible to make an attempt to run the journey in a very short time. Forty-eight hours was considered about the minimum period, allowing for favorable weather and as little delay as possible in re-charging the battery. The importance of the event suggested that every advantage should be taken of its advertising value, and this fact, coupled with the necessity for selecting towns in which a supply was available, ultimately decided the selection of the route. From a study of the map of England it would be possible to select at least two alternative routes to that taken by the car, but they would probably have been easier and the great industrial towns would not have been able to participate in the event. The final section from Manchester to London includes quite a number of short runs, which were not absolutely necessary, but which increased the amount of local interest in the car, and presented opportunities of demonstrating its ability to travel over the rough roads which are usually met with in industrial districts. Some of these roads included exceptionally severe gradients. For instance, in the run from Manchester to Burslem there is the celebrated Kidsgrove Bank, a long gradient some two miles in length, which was surmounted after the car had run nearly 30 miles. It was afterwards found that the station at Newcastle-under-Lyne had been overlooked, and that this particular section might have been short-circuited, but the run through the Potteries proved to be well worth while.

THE WEATHER AND JOURNEY.

After Carlisle was left at 5:30 a. m. on the morning of Monday, June 9, the weather conditions grew rapidly worse, and by the time the Westmorland Hills were reached the wind was blowing a gale and the rain was coming down in torrents. At Penrith J. W. Speight, the engineer of the Penrith Electric Supply Company, and his assistants were most zealous in their efforts to connect up the car quickly as possible. A water resistance had been put together, and, although the station is only a small one of 100 kw. capacity, a charge at the rate of 100 amperes was given to the battery. This particular charge was most timely, for otherwise it would not have been possible to have crossed the Shap Fell. During the run up the long grade to the summit of this well-known mountain district, the car proceeded against the full force of the wind and rain. Fortunately the enclosed coupé body thoroughly protected the driver and the observer, so that readings of the instruments could be taken in comfort. It is not surprising that a considerable amount of time was lost in going over this portion of the route. When Preston was reached the rain was descending in that solid and vigorous style which is the peculiar monopoly of the Lancashire districts. A little time was spent in finding the works and maneuvering the car into the space between the boiler house and a building where the charging leads were run out. From Preston to Manchester was, from the driver's point of view, the worst section of the whole journey. The enclosed glass front was obscured by the driving rain, and the route lay over roads which were deep in mud and water, and in many places were being broken up for relaying tramlines or for repairs. Progress was slow until the Bolton tramways were picked up at Horwich, and the journey was continued by the driver keeping the car in the two tramlines and by the observer looking out of the window on the lee-side and acting as guide. The car was fitted with side lights only, so that the road was only lighted for about ten yards ahead.

Electric Vehicles at Kingston, England.

1. Inspecting a Car.
2. Electrical Men with an Electric.
3. More of the Same.
4. Regulating the Traffic.
5. Electric Enthusiasts.
6. The Mayor of Kingston.

The weather conditions on the following day improved considerably after passing Congleton, and no further rain was experienced from this point to London. Starting five hours late from Manchester and losing an hour in the first section of the run to Burslem, it was felt that London could not be reached in schedule time. Consequently, after Birmingham was passed, it was decided to proceed somewhat leisurely over the rest of the route. For instance, a stop was made at Coventry to exhibit the car to the local press. Similarly at Rugby half an hour was spent in the town before taking the car down to the B. T.-H. works for recharging. A longer route than that originally planned out was taken from Rugby to Northampton because the drive was being made in the dark, and the schedule road was said to be difficult to follow. Luton, which was the last point of call for electrical energy, was not left until 10:30, the car remaining outside the works for some little time while the local reporters came up and numerous questions were answered. The course from Luton was through St. Albans, but on the advice of Mr. Cooke the road through Hatfield was taken to avoid certain stretches of road which were under repair near St. Albans. The final section through the London traffic from Barnet naturally slowed the car up considerably; but, all things considered, the run proved immensely satisfactory. Mr. Fox drove with extreme care, and although he knew that he was a good deal behind schedule time he took no chances even during the "coasts" down some of the long hills.

CHARGING THE BATTERY.

The battery used to furnish electrical energy for the vehicle is made up of 60 cells known as the A4 type—that is, a cell that has four positive plates. The weight of one of these cells filled with electrolyte is 13.5 pounds, the proportions being 9 plates and container 9.75 pounds, electroylte 3.75 pounds. The capacity of one of these cells is 150 ampere-hours and the normal average voltage 1.2. The total weight of the battery used on the vehicle is 900 pounds, and the cells are divided into two sections, one of 36 under the bonnet and the other of 24 under the seat. The normal charging current of the battery is 30 amperes for seven hours. The times arranged for the running of the vehicle did not admit of such a charge being given to the battery, although it would have been possible to give this normal charge if Manchester had been reached early on Monday, June 9, as was anticipated. The average charge given to the battery was, therefore, about 100 amperes and the maximum rate 125 amperes. The minimum rate was 80 amperes. The voltage was 100 to 110 in each case. During charging operations the bonnet was raised from the front battery and the seat and lids over the back battery were taken out. The cells "gassed" freely, and the valves kept up a continuous "chattering" while the charging was being effected. The decomposition of the electrolyte during these heavy charges lowered the liquid in the cells and required the addition of distilled water from time to time. About two gallons were used, one at Kendal (after climbing Shap Fell) and the other at Manchester. Between the last named and London no water was put in, but the cells required topping up at the end of the journey. The filling arrangement is most ingenious. A small brass cylindrical tank is used to hold about ½ gallon, and a rubber pipe is taken from this to a handle fitted with a trigger valve, to allow the water to flow. Two contacts are fitted, one a ring which touches the mouth of the inlet to the cell, and the other the end of the water delivery pipe. A battery of four dry cells and a bell are placed in circuit. The handle is held down over the cell inlet and the valve trigger pressed; as soon as the electrolyte rises to the desired level in the cell the bell rings. This ingenious device saved a lot of time on the road. After seeing it in use, one can imagine what the filling operation would be like with a jug and funnel, especially with the cells immediately under the seat board. The cells remained hand-warm during the run from Carlisle to Manchester, and by the time that Burslem was reached after climbing Kidsgrove Bank they were gassing a little. The maximum discharge taken from the battery was over 150 amperes, this being near Shap village and while mounting a high bridge; the driver had to pull up at a corner to pass some horses which were being exercised, and round the bend was the bridge, with a gradient estimated at about 1 in 4. This heavy discharge lasted about half a minute. In the climb of 10 miles to the top of Shap Fell the average current (taken at five-minute intervals) was 80 amperes, and the maximum current 135 amperes at 50 volts.

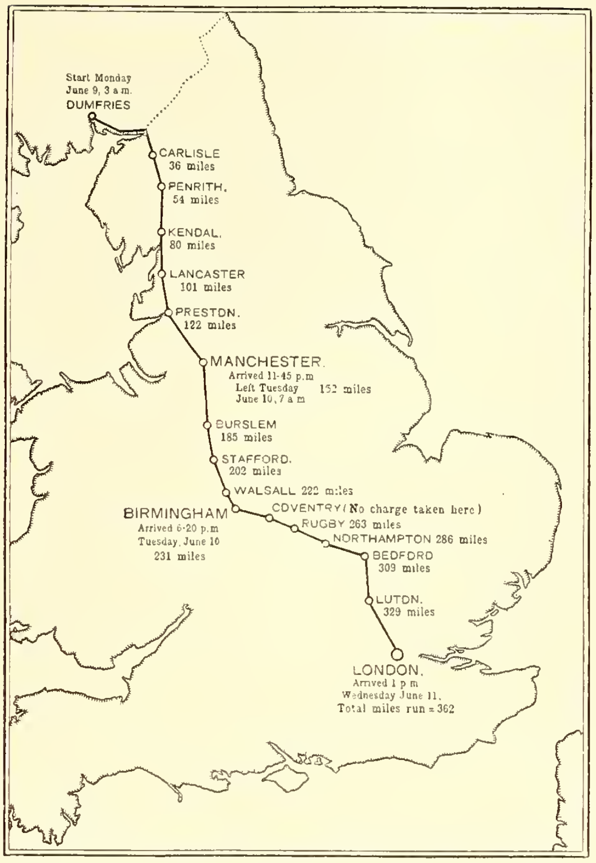


Fig. 1.—Map showing Mileage Run over the Route.

A single series motor is fitted to the vehicle, the machine used being of the Diehl type, a pattern which has been evolved from electric-vehicle data and experience in the United States. The nominal rating is 3½ horsepower at 1,000 revolutions per minute, but the machine is capable of standing an overload for short periods of 300 per cent. The normal current in the armature circuit is 40 amperes, but during the long climb up Shap Fell the average current taken during a period of one hour was 80 amperes, and the maximum current at any time during the run over 150 amperes. The motor is placed behind the front section of the battery, and a portion of the casing is exposed within the cab so that it could be felt as desired. The drive is by cardan shaft to a worm wheel on the differential, the reduction 6½ to 1. The motor bearings are self oiling, and the worm and wheel differential are enclosed in a grease-tight case. There is no clutch fitted to the motor, so that the armature revolves while the vehicle is coasting. We understand that the usual amount of time allowed for the grinding in of the worm was not available previous to the trial run, so that it can be taken that the drive was not as efficient as it would have been under ordinary circumstances. There was a notable difference between the coasting speed of the vehicle during the latter section of the run to that obtainable immediately after the start. The speed of the car on the steepest gradients was about 5 miles per hour.

The chassis has been specially designed by E. W. Lewis, of the Arrol-Johnston Company, to the specification of J. F. Monnot. The wheel base is 8 feet 4 inches, the track 4 feet 7 inches, and the road clearance 10½ inches. The weight of the front part of the vehicle is taken on half elliptic springs, and inverted-type springs 50 inches long are used for the back wheels. There is a transverse parallel motion confining the back axle to a vertical movement, but allowing one wheel to surmount an obstacle without putting any undue strain on the chassis. We understand that this parallel motion has been one of the features of Arrol-Johnston cars for some years past.

THE RUNNING OF THE CAR.

Unfortunately, so little time was available for arranging the trip and getting the car itself in order for

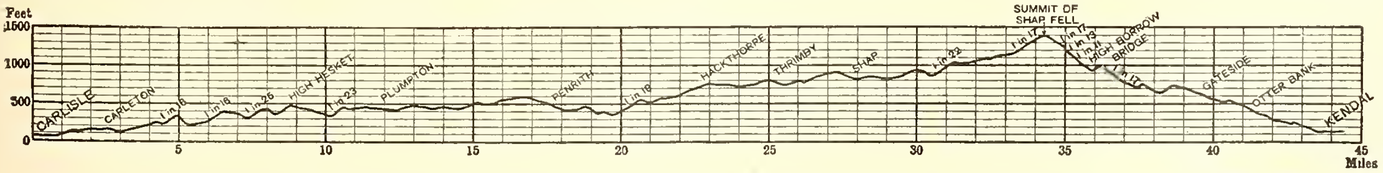
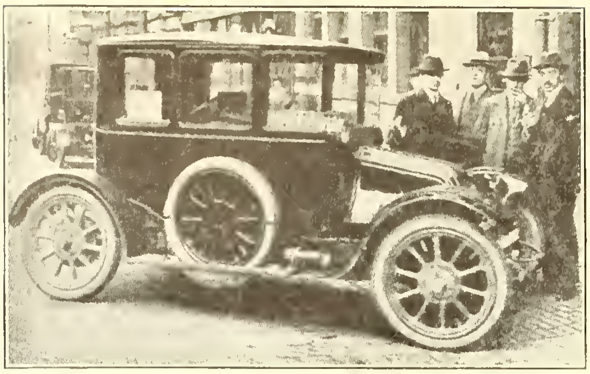


Fig. 2.—The Contour of the Road between Carlisle and Kendal. This was the most hilly section of the route and was run under heavy wind and rain conditions. The cost of running the car over this section was 2s. 8¼d.

the run that it was not possible to attach a complete set of instruments for use during the trial. The actual instruments carried were an ampere-hour meter of the Sangamo type, and in addition a Stanley combined voltmeter and ammeter. It was not possible to fit a speedometer without cutting through the body of the car, so this was omitted, and a mileage recorder was also conspicuous by its absence. The actual energy consumption was, however, provided by the readings at the various stations at which the battery was charged. It is upon these figures that the economies of the run must be considered, for in taking a vehicle of this class on tour the charge made for energy is an item with which the motorist is largely concerned. We have prepared a table which embodies these particulars, and also generally contains the principal data that are of value on a run of this class. We may mention that no attempt was made to economize current on the run, the controller being on the fourth notch most of the time.


The Edison Car at Dale End, Birmingham, England.

There was no breakdown of the electrical equipment during any portion of the run, the connections between the cells of the battery, and also those between the battery and the controller and the motor gave no trouble, and no adjustment of the electrical apparatus required to be made. The joint between the bonnet and the car body was not rainproof, and during the heavy rain on Monday a considerable amount of water found its way in on to the top of the cells near this point. This was mopped out with sponge cloths when the battery was recharged at Penrith, Kendal, Lancaster, Preston and Manchester. As we have already said, the cells were topped up in two places along the route, and at the conclusion of the trial. This operation occupied about 15 minutes. Although the controller was called upon to break currents as heavy as 150 amperes, it successfully performed this duty without arcing. We pay the highest tribute to the springing of the car, and also to the admirable running of the Palmer tires which were used. A spare Sankey wheel with tire was carried, but was not found necessary.

CONCLUSION.

Although the run is not the first long-distance trial made with an electric vehicle in Great Britain, it is, so far as we have been able to gather, the first time that a distance of nearly 400 miles has been covered by an electric vehicle in the total time for running and charging of 58 hours. This achievement was, of course, rendered possible by the fact that the batteries could be charged at a rate almost equal to that of their maximum capacity without injury of any kind. It also demonstrates that a town type of electric vehicle can be used for touring purposes and over the roughest roads and under the worst possible conditions. Although the driver and the observer would have very much liked summer weather during the first day of the run, they feel that the adverse climatic conditions provided an excellent opportunity of testing the car to the utmost.

It is still early to prophesy at what time the central-station interests throughout the country will afford immediate facilities for charging batteries of this class and at the rates at which current was taken on this particular route. It is significant, however, that the success of the run was entirely due to the willingness with which the engineers in the various towns placed their supply at the disposal of the Edison storage accumulater concern. Through an unfortunate misunderstanding in the arrangements for notifying the stations of the progress of the car, several engineers were kept waiting many hours without news, but this did not damp their enthusiasm or detract from their interest in the car when it did actually arrive. It should be mentioned here that at Lancaster the mayor and chairman and members of the Electricity Committee turned out in force. G. C. Milnes, city electrical engineer, and Mr. Hogarth, electrical engineer of Morecambe, also being present. The latter was accompanied by the mayor of Morecambe. At Birmingham, where excellent charging arrangements were made by Mr. Forrest, sub-station engineer, the passengers were welcomed by H. W. Foulds, who materially assisted.

From	Distance, miles.	Running time.*		Average miles per hour.	A.H. output (by meter).	Stopping time.†		A.H. input (calculated).	Average.		Units actually charged at 1d.	Cost d. per mile run.	Watt hours (output) per ton-mile.
		Hrs.	Min.			Hrs.	Min.		Volts.	Amps.			
Dumfries-Carlisle	36	2	30	14.4	94	1	20	120	73	37.5	13	0.86	128
Carlisle-Penrith	18	1	25	12.8	80	2	30	102	73	57	12	0.66‡	215
Penrith-Kendal	26	2	15	11.6	110	2	15	141	73	49	20.25	0.79	205
Kendal-Lancaster	21	1	40	12.8	75	0	50	96	73	45	12	0.57	174
Lancaster-Preston	21	1	30	14	68	1	45	87	73	45	15	0.71	161
Preston-Manchester	30	3	(dark)	10	118	7	0	151	73	39.3	17	0.57‡	189
Manchester-Burslem	33	3	0	11	136	2	20	174	73	45.3	19	0.57‡	203
Burslem-Stafford	17	1	30	11.4	54	1	10	69	73	36	15	0.88	140
									with 13st. passenger				
Stafford-Walsall	20	1	35	12.5	54	0	55	69	73	34	9	0.45	130
Walsall-Birmingham	9	0	50	11.2	26	1	16	33	73	32	18	2.00‡	147
Birmingham-Rugby	32	3	(dark)	9.1	104	1	55	133	73 (dark)	34.6	11.25	0.35	157
Rugby-Northampton	23	2	(dark)	11.5	81	1	20	104	73 (dark)	40.5	12.5	0.54	169
Northampton-Bedford	23	1	35	15.4	99	0	40	127	73	61	8	0.35	152
Bedford-Luton	20	1	30	13.4	75	2	30	96	73	50	20	1.00‡	156
Luton-London	33	2	30	13.2	90	Finish		116	73	36	11	0.33	133

*Including finding electricity works and manoeuvring car in and out for charging.

†Including standing time before and after charging, average about 20 minutes at each place.

N. B.—The figures of cost have been worked out at a uniform price of 1d. per unit, but no charge for current was made at Preston, Stafford, Rugby, Northampton, Bedford and Luton. At Kendal £2. 2s. was charged (on account of special alterations), at Walsall 3⅓d. a unit, at Manchester ½d. a unit and 6s. 8d. man's time. Other places charged 1d. a unit. At each charging point the ampere-hours used on the previous section were replaced, and the A.H. input is calculated from the output at 78% A.H. efficiency, *i. e.*, by dividing by 0.78; at stations marked (‡) a considerable overcharge was given. The average voltage is an assumed figure and the average current is calculated from the output. The same battery was used throughout the trip.

Total miles run 362. Average miles per hour 12.3. Average cost per mile run 0.67d. Average watt hours (output) per ton mile 170.

Opportunities for Electrics in New England

Paper Read at the New England Electric Vehicle Convention

BY F. M. KIMBALL

New England has always led in the encouragement of the electric vehicle industry. It has likewise been generous in supplying money for the development of this field. The sad experience of the electric cab service in Boston in 1905 proves the deep interest of New England business men in the electric motor car. This territory is admirably suited to the electric pleasure car on account of the uniformly good boulevards and the well-developed system of electric charging stations in nearly all of the large centers. New England is also an admirable territory for electric trucks, in consequence of the low rates for electricity offered by practically all of the central stations and in consequence of the establishment of admirable garage service in many of the manufacturing districts. The paper shows wherein New England has been, is, and will be a profitable territory for the exploitation of the electric vehicle.

THAT New England possesses many cogent arguments in support of its contention of being in large measure the birthplace of the modern electric carriage will, I think, be undisputed by those who are acquainted with the early history of the development and exploitation of electric vehicles. The first public demonstration of the electric motor as a means of providing motive power for transportation was made by Thomas Davenport, of Brandon, Vt., in the year 1835, and a similar exhibition was made by Charles Page of Salem, Mass., during the same or the following year. Although the model shown by Davenport was necessarily crude, it operated with a very considerable degree of success, and undoubtedly served as a stimulant to the ingenuity of other inventors who from time to time thereafter amplified and improved the ideas embodied in this original model.

At the time Davenport's invention was shown, the public was almost wholly ignorant of any practical uses to which electricity could be put, and evinced comparatively little interest in the exhibition. It was inclined to look upon the whole affar as nothing more than a very academic experiment and failed to discern the latent germ therein, which was ultimately to expand into such an enormous and valuable industry.

After a lapse of sixteen years—in 1851—we find the announcement of another similar experiment made by Professor Page, of Washington, D. C., who built and exhibited, on the B. & O. Railroad, a model motor-driven car, capable of running at the rate of 16 miles per hour, and embodying the same fundamental principles as were disclosed in Davenport's model, but very considerably improved in design, construction and resultant operation. From time to time, during the next thirty-five years, other inventors brought out new and more or less successful models, many of which embodied material improvements, and were very ingenious in design and construction.

Prior to 1885, experimenters had been generally obliged to rely upon primary batteries for a supply of electricity; but the expense of maintenance, as well as the very limited output per pound of weight, and the uncertainty and annoyance attending their use, rendered them totally unfit for employment in the service under consideration.

About 1885 the storage battery began to establish itself as available for commercial purposes, and those who were interested in perfecting the electric vehicle were quick to avail themselves of this new power supply, which, together with the rubber tire, soon proved to be the long-sought keys to success. It was not until 1888, however, that engineers and far-sighted business men really took up the development and exploitation of the electric road vehicle in an aggressive and systematic manner. The first electric street car had been put into operation by Frank J. Sprague, in Richmond, Va., in February, 1888. The success of this installation as well as the still greater success attending the electrical equipment of the West End Street Railway in Boston, which shortly followed the equipment of the Richmond road, gave a new impetus to the interest and efforts of those who were experimenting with electric road vehicles, and real progress followed rapidly.

In the summer of 1888, an electric vehicle for one passenger, built by the writer for P. W. Pratt of Boston, was shown publicly on the streets of that city.

In 1892, the Holzer-Cabot Electric Company of Brookline, Mass., was commissioned by Fiske Warren to build, for his use, an electric carriage of a design and capacity which should make it practicable for short tours. An electric brake, capable of carrying eight passengers, was at once designed and successfully completed. Its operating radius on a single battery charge at 8 miles per hour was from 40 to 50 miles, and it was capable of making a maximum speed of about 16 miles per hour on a level road.

Continually increasing progress was made from year to year thereafter, and by 1898 the business had assumed sufficient importance to be classed as an industry, and in the fall of that year, for the first time, a considerable collection of sample electric vehicles was shown at an electrical show held in Madison Square Garden, New York City. Public interest was considerably aroused by this exhibit, and the advantages of the electric vehicle were so obvious that it was not difficult to interest buyers, nor secure capital to manufacture.

The advances made in the design, construction and operation characteristics of electric pleasure vehicles during subsequent years have enabled manufacturers to produce carriages having an operating radius on one charge running up to 75 miles or more, and so thoroughly reliable and easy of operation as to make them pre-eminently favored by those who desire the most elegant equipages for city service, as well as by ladies for shopping, calling, or pleasure driving.

While the electric vehicle is not intended nor adapted to be used for racing purposes, or for tours into sections of the country remote from cities or towns, it is interesting to note that special vehicles have been designed with battery capacity permitting a run of 300 miles on a single charge. In the matter of speed, electric vehicles may be equipped so as to equal if not exceed the performance of gasoline machines. Racing cars on a test have shown the extraordinary record of one mile in 34 seconds. Such performance of electric vehicles is abnormal and not to be encouraged.

The electric pleasure vehicle of today well meets all normal and average requirements. It will carry one as far and as fast as is ordinarily required from its principal competitor, the gas car. This service will be achieved with lower maintenance, smaller tire expense, and at the present cost of gasoline, as compared with charging rates of the larger central stations, the cost per ton-mile for power used will be quite comparable with that of the gas car.

While the pleasure car has been undergoing extensive improvements and popularization, the possibilities of the commercial vehicle have not been neglected, and since about 1900, which year perhaps most nearly marks the beginning of real activity in the line, equal if not greater advance has been made in developing and popularizing the electric wagon as a means of merchandise transportation.

The evolution of the modern electric commercial vehicle is fully as striking as that of the pleasure vehicle. Its mileage radius on a single charge has been greatly augmented: that is, instead of making only 25 or 30 miles on a charge, the minimum mileage radius of a present-day, three-ton truck is 50 miles or more. Attempts at excessive speed have constituted one of the chief causes for failure in the use of heavy gasoline trucks heretofore, and the very fact that the driver cannot race an electric is one of the cardinal points in its favor. The motors, controllers, transmission mechanism, tires and chassis have been greatly improved and perfected, and that most important but formerly most uncertain factor, the storage battery, has been brought to a state of perfection and reliability as great, relatively, as that of any other part. As a general proposition, a given number of commercial electric vehicles can perform fully twice the service that an equal number of horse-drawn vehicles of equal carrying capacity can perform in the same period of time, and the cost of operation will be but from two-thirds to one-half, depending upon the number of vehicles employed. The commercial truck of a given capacity requires not more than half the space on our streets required by a horse-drawn truck of corresponding capacity, while its operation is carried on without the production of any dirt or litter, and with infinitely less noise and entire freedom from unpleasant odor. It can be turned about and brought to a given location in very much less space than the horse-drawn vehicle, thus making it practically advantageous in congested freight yards, mercantile districts, and at terminal points. It is reliable in all seasons, in all temperatures, and under all vicissitudes of climatic conditions. The electric wagon can be operated 24 hours a day, can be stabled where horses are not permitted, will do its full quota of work despite adverse weather or road conditions, consumes much less time in making deliveries than the horse, and can make the return trip to center of distribution at much greater speed.

During the particularly torrid weather in July and August of 1911, it is estimated that 50,000 horses, valued at from $8,000,000 to $10,000,000 died from the effect of heat within a period of 6 days. No mortality from similar causes has been reported in the case of electric vehicles.

Both pleasure and commercial vehicles have been greatly reduced in first cost and weight during the last four or five years, and commensurately increased in strength, efficiency and mileage radius. In fact, so far as longevity, reliability, simplicity, lower fire hazard to both vehicle and load, decreased noise and odor and low operation cost are concerned, the electric vehicle is in every respect equal and in many instances superior to the gasoline machine. Due to its simplicity, reduction of moving parts to a minimum, ready accessibilty for repairs, the electric vehicle permits the employment of operators at a normal wage.

Furthermore, the electric is superior to the gasoline car in the smaller number and cost of renewal parts. It has an advantage in the absence of moving mechanism with consequent elimination of all noise and odor when the car is at rest. It is inherently a "self starter." For a given number of tons transported, the damage to roads is less with the electric truck than with horse-drawn vehicles. While we cheerfully admit that the gasoline car fills a demand which cannot be as successfully met by the electric car, the latter is, as well, pre-eminent in its own field. There should be no straining in an endeavor to force the electric vehicle into service for which it is not adapted. There is ample room for both, and in the well remembered words of the late Admiral Schley, there is "glory enough to go around."

While New England cannot and does not claim all the credit for the final development and perfection of electric road vehicles, as practical instrumentalities in the art of transportation, she does claim—and I believe rightfully—to have been the birthplace of the original conception of the ideas based on which the enormous industry of the present day has been erected. New England furthermore is entitled to recognition as having furnished a great deal of the capital which supported the efforts of the earlier experimenters and builders, as she also furnished a large share of the capital which was unfortunately dissipated in the first attempts to establish an electric cab service for public use.

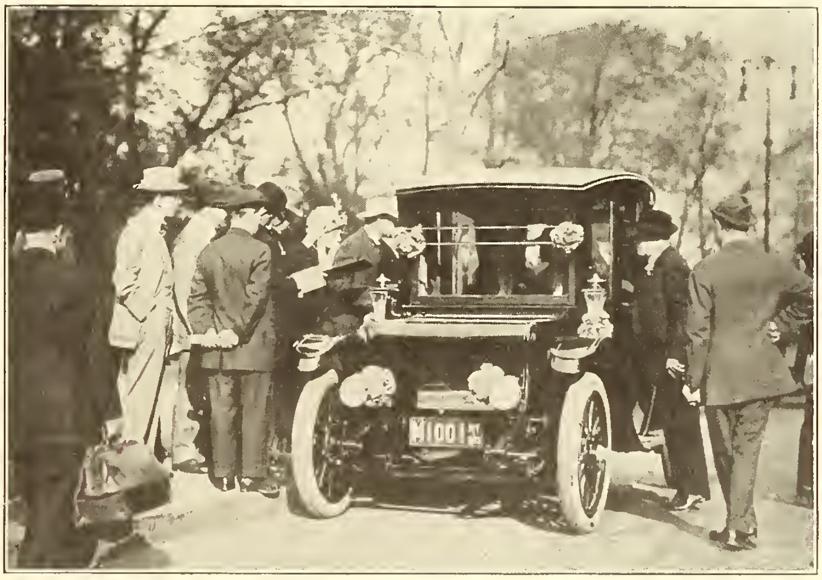
So far as I am aware, the first company to take up the manufacture and sale of electric carriages, as a definite and permanent business, was the Pope Manufacturing Company, of Hartford, Conn., which established its motor carriage department early in 1895, and actually began the manufacture of electric vehicles in July of that year.

It was in the city of Boston, during the year 1900, that the New England Electric Vehicle Transportation Company was organized, and this company actually put about one hundred cabs into service on our streets. The cabs achieved instant popularity, but although the promoters labored indefatigably to make the service successful and permanent, and contributed large sums of money to that end, the vehicles were withdrawn in 1902, owing to the very high and irreducible costs of maintenance and operation.

The whole country appreciates and acknowledges the natural beauties of this corner of the United States. Nowhere in North America is there to be found more beautiful and diverse scenery and a more varied topography than in the New England states. A very complete and generally well maintained network of roads gives access to every nook and corner of this section, and in recent years, the enterprise of various state highway commissions and boards of public works in large cities and towns have provided a system of state roads, boulevards and pleasure drives not surpassed in any country. Considering the rather accentuated rolling characteristics of New England's territory, these boulevards and roadways possess surprisingly easy grades, thus making them, all things considered, ideal thoroughfares over which the possessor of an electric pleasure vehicle may journey from city to country, from state to state, or from ocean to mountain, for recreation, health-giving sport, or in the pursuit of business.

Along these magnificent highways one may almost glide from one end of New England to the other, and, in respect to urban drives, I doubt if any city in the world can match in total strength, quality of construction, natural adornment and beautiful environment, the great network of boulevards and pleasure drives lying within a radius of fifty miles of Boston.

The work of the Metropolitan Park Commission of the Boston district, established about 1893, has included among other important activities the building of more than one hundred miles of magnificent roadway through forest reservations; along river banks, and on the borders of ponds and ocean shore, within the domains of the park boards' jurisdiction. These streets are thoroughly lighted, carefully patrolled by special police, and maintained in the most perfect condition of surface and service, making them in all respects ideal for travel by the electric pleasure vehicle. Electric light stations are scattered at frequent intervals throughout the whole of New England, and the management of these stations has been very progressive in providing means for charging both pleasure and commercial vehicles.


Announcing the Score to the Winner of the Manhattan Automobile Club's Recent Secret Time Contest at New York—Mrs. Alice Waxham in a Silent Waverley Electric.—(Courtesy of New York Edison Company.)

Signs of special and uniform design are distributed along the roads at frequent intervals, indicating the nearest point at which charging facilities are available, and it is quite possible to start at Boston and go to the confines of the eastern states in any direction without losing touch with charging stations, or, fully as important, with good hotels.

Although a less number of electric trucks are operated in New England at present, proportionally, than in some other sections of the country, the demand is growing rapidly, and the registration of vehicles in 1913 is thus far nearly 30 per cent ahead of that for the corresponding period in 1912. The streets of Boston as well as those of other prominent cities and towns in New England are, for the most part, thoroughly paved, well cared for, and otherwise admirably adapted to the operation of the electric wagon. The charging rates are reasonable. The representatives of manufacturers and agents are alike most willing and desirous to co-operate with owners or prospective owners of electric vehicles, in selecting wagons or trucks of sizes and types best adapted to assure the highest efficiency of operation, and the greatest satisfaction in the desired service.

The value to the central station of the pleasure and commercial vehicle is shown by the fact that from 1900 to 1912, the estimated income to the central stations of the country, taken on the minimum basis of 4 cents per kiolowatt hour, amounted to $1,800,000. In 1911 alone, the revenue was estimated at nearly $500,000. Considering the greatly increased number of electric vehicles now in use, the central station revenue from this source may be taken as closely approaching $900,000.

In a little over a decade, the automobile industry including the manufacture of pleasure and commercial vehicles, has risen from practically nothing to third place in importance among all industries. The number of commercial electric vehicles now in operation is probably 30 to 40 per cent of the total number in use, this notwithstanding the fact that there are only about 12 or 15 active commercial electric vehicle makers in the United States, compared with at least three or four times as many makers of gasoline trucks and wagons.

As indicating briefly the possibilities in sight for the commercial vehicle, statistics show that sixteen times as much freight is handled on roadways as on railroads, and competent authorities have estimated that to supply the requirements of the United States, 3,000,000 power vehicles would be required. The satisfaction attending the use of electric commercial vehicles now in service has been so great that one need have no hesitancy in regard to the permanency or growth of the industry.

In the twelve years up to 1911, it is estimated that approximately 4,000 electric trucks were built and sold. Of this number, nearly 32 per cent were sold in 1911. Approximate figures as to the number of gasoline and electric vehicles sold for commercial purposes from 1908 to 1912 are as follows:

1908, 2,500; 1909, 3,288; 1910, 4,000; 1911, 14,000; 1912, 30,000 (of this number 7,000 to 8,000 were electrically propelled).

It seems safe to estimate that the total number of electric vehicles in use by the end of 1913 will exceed 40,000.

Almost countless suggestions for the use of electric vehicles in new fields are being made and investigated. The pleasure vehicle is making its own way and establishing itself almost spontaneously. Of the many suggestions for new commercial service, none appeals to me more than the desirability of utilizing electric wagons in the ice and milk business. It seems to me that ice and milk delivery constitutes a service in which electric vehicles may serve an almost ideal purpose. The delivery of these commodities is usually made during the early hours of the morning, and at that hour the rattle of hoofs and rumble of milk and ice wagons are particularly objectionable. In both these lines of business the freedom from dependence on the horse would permit a service which would seem to be much more sanitary, much more quiet, and much more economical. The rubber tired wheels of the electric vehicles would make little or no noise on the pavements; there would be no pounding and pawing of restless horses; nor rattling of heavy hitch gear or harness. In the early hours of the morning before the streets become congested with other travel, the electric wagon could make very quick time between the loading depot and the first stop on the delivery route. The advantages of this gain in time are obvious. The acceleration and movement of the vehicle from house to house would be more rapid, and the general style and appearance of the vehicles from which such important commodities as milk and ice are delivered would certainly be more attractive and more in keeping with the wholesomeness which should surround the delivery of all articles pertaining to our food supply. I believe that there is also an excellent field for the introduction of electric wagons into the delivery service of our grocers and provision dealers, but in this case, as in the milk and ice business, the problems involved require careful attention for satisfactory solution. The rewards of the manufacturer who first successfully provides suitable electric vehicles for this class of work will doubtless be prompt and adequate.

The Electric Motor Car Club of Boston and the New England section of the Electric Vehicle Association of America are working individually and together to secure legislation, city ordinances and police regulations, which shall be for the benefit and advantage of all those who use this modern method of transportation. The greatest future of the electric vehicle is in the eastern states, since this section has the most dense population, the most extensive street freight movement and demands a character of service to which the electric vehicle is best adapted.

The day is undoubtedly not remote when New England may claim the largest number of pleasure and commercial vehicles per capita of any section in the country, as she now can claim, with all modesty, to be the birthplace of this great modern industry, the products of which are destined to perform such an enormous part of the world's work in the future.

Activities of Chicago Section, E. V. A.

Despite the warm weather, which militates against large attendance at indoor meetings, the activities of the Chicago Section Electric Vehicle Association of America, continued unabated during the past month. No specific program was outlined for any of the meetings, the discussions being informal in character and relating to various subjects as they occurred to the members present at each gathering.

In June 17, Homer E. Niesz, chairman of the Chicago section, appointed a convention committee to have charge of the general arrangements for the annual convention of the association which will be held in October, as follows: John F. Gilchrist, E. E. Witherby, W. L. Rudd, Uri B. Grannis, L. E. Burr, G. H. Atkin and L. E. Wagner, in addition to the officers of the section.

The chairmen of standing committees for the ensuing year were also appointed as follows:

Membership, E. E. Witherby.
Publicity, Henry Farrington.
Garaging Facilities, Ernest Lunn.
Papers, D. C. Arlington.
1914 Show, L. E. Wagner.
Disposition of Second Hand Cars, L. E. Burr.
Traffic Regulation, W. J. McDowell.

There was considerable discussion with respect to an electric truck show in connection with the coming convention, in view of the fact that the electric truck manufacturers will not exhibit at the national automobile shows in New York or Chicago next winter. It was decided, however, that the time was too short in which to arrange for an adequate exhibit, and the probability is that there will be a mammoth electrical show in Chicago in the fall of 1914 when the electric trucks and pleasure vehicles will make a conspicuous exhibit.

At the meeting on June 24, an informal discussion on charging equipment was held. J. P. Lyons, of the Electric Products Company, Cleveland, led the discussion, pointing out briefly some of the salient features of the apparatus recently developed by this company. A description of an automatic rectifier for battery charging, which automatically cuts off the current when the battery is fully charged, and compensates for interruptions during a charge, proved of exceptional interest. In the general discussion the high cost of rectifier tubes was deplored, especially in view of their short life. Garage owners seemed to favor motor-generator sets on this account. The points touched upon by Mr. Lyons seemed of such general interest that he was requested to prepare a paper on the subject of "Charging Apparatus" to be read at the forthcoming annual convention.

At the meetings on July 1 and 8 minor business incidental to the joint field day and picnic with the Garage Owners' Association was taken up. This picnic is to be held at Cedar Lake, Ind., on July 25 and a very excellent program of social and athletic features has been arranged. Prizes amounting to several hundred dollars have been donated by manufacturers.

On July 15 further details relative to the picnic were discussed. The section also voted to co-operate with the Chicago Automobile Club and the Motor Car Club in providing an outing for local orphans. Chairman Niesz augmented the convention committees already appointed by naming George H. Jones chairman of the finance committee.

New Manufacturer of Electrics

The Edison Electric Vehicle Company, a corporation located at Lawrence, Mass., is about ready to place on the market a new line of electric trucks and pleasure cars. At one of the recent meetings of the Electric Motor Car Club of Boston the truck was displayed.

A point of special interest in the equipment of the truck is the use of the worm drive. A Westinghouse motor transmits the power to a shafting that in turn connects with the rear axle. Edison batteries of different sizes are used according to the capacity of the different trucks to which they are to be fitted.

Proper Illumination of the Garage

Correct Lighting Is as Important as Any Feature

BY WILLIAM SELZ

STRANGE as it may seem, in these days when scientific management is a reality and efficiency is the watchword of the commercial and industrial world, vast numbers of people never associate efficiency and lighting.

The garage, for instance, is built, provided with its heating plant, its washing devices, charging equipment, lockers, work benches, etc., and, as a minor consideration, some lighting equipment is installed here and there.

Good daylight illumination is just as important as night illumination as during the daytime most of the cleaning and repairing is done. To work effectively one must see well, and certainly that is not possible unless full advantage is taken of natural light. In many of our large city garages it is impossible to get a great amount of daylight illumination; nevertheless most efficient use should be made of all light available.

Often the single-car garage is made just long enough and just wide enough to admit the car, with perhaps 18 inches of passage on either side. In a structure of this kind, the windows should extend nearly to the floor, so that there will be plenty of good daylight illumination around the body and wheels. Nothing is more trying on one's temper than to change a tire, or adjust the tension on a chain drive, when only about half what is done can be seen. In a wide garage, windows of average depth are usually sufficient for the angle of darkness to fall outside of the wheel base.

In the main service room of the public garage only low intensity general illumination is necessary, as the machines are merely run in for charging or layover. In the wash room, however, or over a wash rack, special attention should be paid to the illumination.

What is considered the ideal way artificially to illuminate a car on a wash rack is to arrange a number of light units above, so that light is thrown in from all sides, then to place a second set of units near the floor so as to likewise throw light in from all sides. In this way the washer can see beneath the fenders, under the axles, and the body. However, it is not often practicable to put this second set of units near the floor unless three sides of the wash floor are available for placing the lamps; the machine being run out the same way it was brought in.

In the repair shop there should be good general illumination. Sometimes it is necessary to provide certain machines where fine work is done with individual lamps on special supports. These lamps should be equipped with proper reflectors which will throw the light on the work and keep it out of the eyes of the workmen.

Storage rooms need only a low intensity of general illumination, and that only when a car is brought in or taken out.

Considerable attention must be given to the selection of the proper reflector. Except where all-frosted lamps are used, and in some cases where a reflector cannot be used, incandescent lamps should never be used without a reflector of some kind. Reflectors are necessary both for the efficient use of the light from the lamp and for the protection of the eyes.

In the service room glass reflectors are sometimes preferred because of their appearance; nevertheless it will be found that rather deep metal reflectors, which shade the lamp well below the horizontal, are splendid for this purpose, as there is no cross light thrown into a driver's eyes in coming in or leaving the room. This effect is also not prominent where good glass reflectors are used, but bare lamps should not be tolerated at any time.

George Fitch on the Electric Car

[*Copyrighted by George Mathew Adams.*]

THE electric car is the last word in comfortable living. It is a perambulating parlor in which women can travel from reception to reception in the lap of luxury, bounding blithely from curb to street car through the crowded and swerving traffic of a great city.

An electric car is simply a rubber-tired coach which carries several bushels of electricity in a large bustle. It can be driven by a woman or a mere child and usually does not travel over ten miles an hour. It does not explode or have magneto trouble, and it has no spark plugs, carburetors or water tubes. Because of this the consumption of profanity required in driving an electric car is very small indeed. However, one electric car driven down the middle of a narrow street by a beautiful but thoughtless lady can keep forty gasoline cars on the low gear behind it and bring the general level of conversation in the neighborhood down 75 per cent.

Electric cars are now the standard advertisement of prosperity. There was a time when a man could buy a gasoline car and insert himself permanently into the best families thereby. But now everyone whose credit is good owns an automobile with at least four cylinders, and the only way to shine in the eyes of the walking public is to amble haughtily down the street in a neat little two-room cottage on wheels with a conservatory in glass vases and $400 worth of plate glass in plain view.

Electric cars are now very expensive. The makers claim that this is because of the extraordinary costliness. But it will be noticed that in order to keep the price up electric cars are made more elaborate each year. The new models have room for a small tea party in arm chairs and are so handsomely finished that a speck of mud creates as much havoc to their complexions as it does on the nose of an heiress. Some day the supply of electrics will exceed the demand. Then the price will come down on the run, and lighting companies will begin giving them away, as they do electric irons, to increase the demand for current. This prospect should be an inducement for every American citizen to prolong his life as much as possible.

The electric car is the most successful method up to date of making the rich man glad he is alive. But even this joy has its drawbacks. Nothing makes the plug citizen so content with his lot as to see the panting rich man pushing home a 2,000-pound electric while his wife holds the steering lever with a haughty glare and tries to discourage comment from the passerby. When electricity can be bought in buckets at the corner grocery and poured into the bustle of the limp and exhausted electric car the life of its owner will not be so speckled with gloom.

For the lighting of wash racks, metal or mirror-lined reflectors giving a sidewise distribution of light should be used, although vertical reflectors set at an angle are often used with excellent results. Metal reflectors are recommended for the repair or machine shop.

An authority on illuminating engineering recently summed up the basic principles underlying garage lighting as follows:

(1) There should be plenty of light.

(2) The light sources should be properly arranged.

(3) The light sources should be equipped with proper reflectors.

(4) The switches should be sufficient in number and properly located.

(5) There should be a number of outlets for portable lamps and tools.

(6) The interior of the building should be finished in some light color.

(7) The window area should receive careful consideration.

(8) The light units must be kept clean.

Tires for Electrics

"A new electric tire called the Goodyear Power Saver Pneumatic tire, is to be Goodyear's contribution to the electric vehicle industry for 1914," announces L. C. Rockhill, manager automobile tire department of the Goodyear Tire & Rubber Company, Akron, Ohio, who has just returned to Akron after an extensive tour of the Pacific coast, investigating the automobile conditions of the country.

In perfecting an ideal tire for electrics, two fundamental qualities must be incorporated in order to make a desirable tire, according to Mr. Rockhill. These properties are resiliency and durability. The tire must not be made so resilient for the purpose of saving power, that it will not wear for a reasonable mileage, and on the other hand, durability cannot be accomplished at too great an expense of resiliency.

There are very few people who differentiate between tires for gasoline cars and the specially built tires for electrics. The electric tire is highly resilient, and consequently super-sensitive to the evils of under-inflation and overloading.

However, any automobile engineer knows that a gas car tire absorbs more energy than an electric tire. The gas tire's ordinary plain weave fabric, in which the warp and filling have the same strength, laid on the bias gives the maximum strength and durability. Four, five, or six piles of this fabric impregnated with gum and vulcanized together as a unit, form a body of considerable rigidity. This rigidity when performing its duties as a tire, utilizes considerable energy to produce the flexing of the walls of the tire. In the case of the gas tire, the recoil is taken care of almost entirely by the air pressure, because the fabric walls are quite sluggish in this respect.

Now, in order to produce a more efficient tire, that is, a tire that will consume less power, a change in the structure of the fabric was tested. One of the most efficient tires on the market is made of fabric which consists simply of warp threads or small cords, all parallel to each other, and surrounded and separated by a thin envelope of rubber. The several plies of this fabric are placed at 45 degrees with each other. Thus by having each individual end of each ply of fabric entirely surrounded by rubber of high elasticity and resiliency, the casing walls will flex with the minimum of resistance. The difference in the rigidity in the walls of a gas and electric tire may be readily noticed by depressing the deflated tires with the thumb.

At one step in the evolution of the electric tire, a fabric compound of warp threads with the exception of a very light filling thread spaced every ⅜-inch was tried. This filling thread was used simply to facilitate handling the fabric, and at the time of its conception, nobody thought any serious low efficiency would result. The effect, however, was to reduce the efficiency.

Among other things tried was that of laying the warp fabric at an angle greater than 45 degrees with the center line of the tread. A point was found between 55 degrees and 60 degrees where the efficiency was a maximum, but latter arrangement proved to give decidedly inferior wearing qualities.

This last mentioned point is a good example of the statement made earlier, to the effect that high excellence in one quality might be offset economically by a sacrifice among the others.

"For some time past, rather serious complaints have filtered in along with the boosts about the limited life of the tires," concludes Mr. Rockwell. "I have explained that we had to build a tire which structurally was less firm and substantial in order to make it consume the minimum amount of power. We put a little better gum into this tire, and absolutely the best cotton we could buy, and found that we get just as long life from these tires as from equivalent gas tires during our tests. When the public could not get the mileage, we were puzzled, and it took us some time to find that overloading or under-inflation was the crux of the whole situation. The explanation is that the walls of the fabric flex so readily that with under-inflation or overloading it is stressed excessively, resulting in premature failure. We feel certain that some very good types of tires have been forced off the market because of the practice of undertiring the cars. True, an electric is slower and easier than a gas car on tires, but,—an electric tire is more sensitive to neglect than a gas tire."

A Good Cold Weather Record

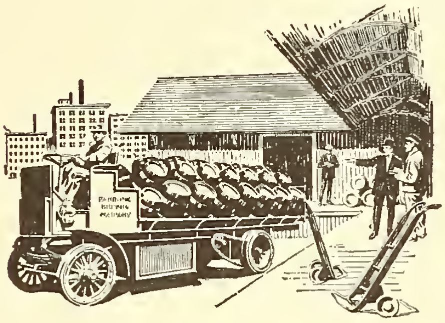
A remarkable feat accomplished in this city by an electric car was a mileage run made by a Rauch & Lang electric brougham in January," said the "Electric Man," Denise Barkalow, manager of the Electric garage at Fortieth and Farnham streets, Omaha, Neb., when talking over some of the things that have been done by the cars that he disposes in Omaha and surrounding territory. "The total distance covered was 72.8 miles. This may not sound quite so remarkable, but when one considers the time of year, when the weather was so cold that the batteries could not respond as quickly as in other times of the year, it is amazing. Also the route was an extremely difficult one, including all the steep grades, such as California street to Thirty-eighth (which, by the way, was taken twice), including the road to Millard, with its country road and hills; also Dodge street past Fair Acres; the balance of the run was made about the city. The car was one that had been in service several months.

"This run showed clearly the improvements that have been made in the construction of the Rauch & Lang cars, as it was only a few years ago that thirty miles was considered an excellent run by any electric car."

Electric Vehicles in British Columbia

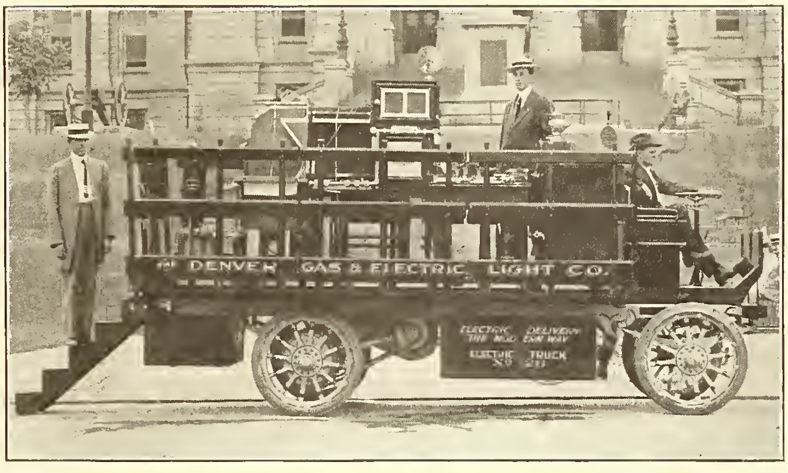
Paper Read Before the Canadian Electrical Association

BY C. RUMMEL



IT IS the general policy of the British Columbia Electric Railway Company to leave the selling of appliances and current-consuming devices as much as possible to local dealers and agencies. This policy is based on the idea that its business is primarily that of a central station and that it should enter into the actual sale of current-consuming devices only when the local dealers and agents fail to push the sale of any particular branch as vigorously as the conditions warrant.

In the field of electric vehicles the company has found that there were a number of agencies within its territory, the same firms offering both gasoline and electric vehicles. These firms sold quite a few pleasure cars of the electric type but apparently made very little effort to introduce electric vehicles of the commercial type. It was found that when these dealers, being representatives of both electric and gasoline cars, came to a probable customer, the "prospect" generally knew considerable about gasoline cars but very little about electrics. The agent would tell him that he represented both electric and gasoline cars and would put forward the advantages of the type which the "prospect" preferred. This method of doing business was rather a detriment to the introduction of electric vehicles within the territory. To me it seems rather a mistake on the part of the manufacturers of electric vehicles to act through these combination agencies. The agent is, of course, after the dollars and cents and will naturally interest himself chiefly in the article which he can sell in the easiest way and to the greatest number. I have been told by a factory representative that the manufacturers do not care very much in the case of truck sales, their object being to have agencies sell pleasure cars, and that the field for electric vehicles of this type is so limited that it is impossible for one firm to handle the exclusive agency. The manufacturer noted has doubtless come to this conclusion after a thorough trial and we must take his statement as warranted.



Baker Truck Used by the Denver Gas and Electric Light Company in House to House Demonstration. The Stoves, Fans, Vacuum Cleaners, etc., Are Operated by the Truck Battery.

As far as Vancouver is concerned, the company found that the practice of selling through combination agents did not result satisfactorily to its interests in connection with the sale of electric cars of the commercial type. As a result of these conditions the company this year decided to take out an agency, enter the selling field and make a genuine effort to introduce electric commercial cars within its territory.

The first attempt to sell electric cars in Vancouver was made some seven years ago when a five-ton Studebaker truck was purchased by a local firm. There was at that time no proper electric garage or adequate arrangement for charging batteries of electric trucks, nor was the proper usage of the truck understood. Hence the car suffered considerably because of lack of facilities and ignorance as to the proper method of caring for it, this being especially noticeable on the point of overloading. However, in spite of these handicaps, this five-ton truck is still in use today and doing good work.

In connection with its own work, the company purchased three electric trucks last fall, these being the only sales of electric trucks made at that time by local agents. These vehicles were used as a meter wagon, an arc lamp wagon and a line wagon, and did satisfactory work through a severe winter during which there was a heavy snow fall such as had not previously prevailed in this country for 15 years.

On the basis of the good showing made by the few electric trucks in Vancouver, the company felt that vigorous efforts should be made to introduce this type of vehicle, although still preferring to leave the matter in the hands of the agents providing the business was properly pushed and adequate garages and facilities for caring for the vehicles would be provided. Upon canvassing the agents it was found that they preferred to have nothing to do with the garaging of trucks but preferred to confine their business in the electric line to pleasure vehicles only. The company then decided to take up the agency for commercial cars as previously noted.

At the very outset the company engaged an electric vehicle expert of eleven years' practical experience, both in selling and garaging. This man was given the advantage of extensive advertising in the daily press, thus thoroughly acquainting merchants with the advantages of electric trucks as well as the entrance of the company into the business. The salesman began his campaign among the wholesale men on February 15, and has since been conducting an active canvass by personal visitation, follow-up letters, pages in the monthly motor magazines, etc. One very effective method followed was to offer the service of one of the company's trucks to reliable "prospects" for an ordinary day's delivery of the firm. Such an illustration proved conclusively the value of the truck to the merchant's business.

Since this salesman took hold of the work, sales of electric trucks have been made as follows: A two-ton truck to a wholesale fruit merchant, a two-ton truck to a wholesale hardware firm, and a one-ton truck for a hotel bus.

During the period the company has also found use for two two-ton trucks which have replaced a gasoline truck and a horse-drawn wagon and a business electric for the light and power department. The two-ton truck for the fruit merchant was placed on the streets last week and has so far given perfect satisfaction. The company's new trucks are also working satisfactorily and the hotel bus was placed in operation about June 1.

In addition to the company's orders, there have been sold to Vancouver firms through outside agents a two-ton truck of the electric type to a milling firm and a 750 lb. delivery rig to a local fish concern.

The electric vehicle representative reports that his "prospects" are many, and every merchant to whom he has explained the electric trucks, even milkmen who have a house to house delivery, are interested.

In carrying out its business as an agent for electric vehicles the company generally orders the chassis only from the factory, the bodies and tops being built in the city to suit the purchaser. This plan is necessary from the standpoint of economy owing to the duty which must be paid on these cars from the States. It is also found that each customer has his own ideas as to style, dimensions, etc., of the top and body, and, if this work is done locally, closer supervision can be given to each part by the purchaser and he is better satisfied with the result.

Early in the campaign for the introduction of electric trucks the company found that there was a necessity for a proper garage for this type of vehicle. To meet this condition and cover the care of the company's trucks as well as those of customers who did not desire to install their own charging outfits, it was decided to arrange for a garage in the central part of the city. This is now being built, and will provide 110 by 94 feet of floor space and a charging outfit consisting of a motor generating set of 45 kw. capacity. In the garage will be located offices for the superintendent and mechanic, battery room, store room for spare parts, tires, etc.

Before plans were finally made for the company's garage a meeting of all the dealers in the city interested in the sale of electric trucks was held. At this conference the electric vehicle question was discussed in all its phases, various types of batteries, their behavior, their troubles and other points of interest being thoroughly considered, the meeting thus being most helpful to all in attendance.

At this meeting the charges which the company proposed to make for caring for electric vehicles of the commercial type at its garage was outlined and an agreement reached with the dealers on this point. These charges, which cover all types of battery, were as follows:

Capacity of Truck.	Garage Charges Per Month.
750 lbs.	$45.00
1000 lbs.	45.00
2000 lbs.	55.00
4000 lbs.	60.00
7000 lbs.	65.00
10000 lbs.	70.00

These garage charges cover the supply of current necessary for the operation of the vehicle, charging of the batteries, storage of the vehicle, daily washing and oiling, and the making of minor adjustments. These garage rates being established, the electric vehicle representative was able to quote to his "prospects" with assurance just what the cost of their deliveries by electric truck would be, a most telling argument with the prospective purchaser.

It is not the intention of the company to care for pleasure vehicles in its garage, as this field of work is already receiving the attention of the regular garages. For the storage of a car of this type, current for and charging of batteries, daily washing and oiling, etc., a monthly charge of $30 is made and in some cases the garages deliver and call for the vehicles.

A report has been recently obtained from the provincial authorities covering the number of electric vehicles which are now in use in British Columbia. According to this statement there are 100 pleasure cars and 18 electric trucks now operating within the province.

The field covered by the British Columbia Electric Company comprises as a territory in which electric trucks would be chiefly used, the cities of Vancouver and Victoria. The references made in the preceding paragraphs to its agency for commercial cars, the establishment of garage, etc., refer only to Vancouver, where the head office of the company is located. The notation with reference to electric vehicles, however, applies to the entire province, and a number of these vehicles are operated in and about Victoria. Last year a large milling firm bought a two-ton truck for its Victoria trade and after operating the vehicle for a year was so satisfied with the results that this spring the concern purchased a five-ton truck and a two-ton truck, the latter now being in operation in connection with the firm's business in Vancouver.

In both Vancouver and Victoria a number of the private garages are equipped with charging outfits for electric vehicles and the company also plans to maintain charging equipment at central points within its territory.

The various reasons why central stations are or ought to be interested in electric vehicles have been talked and written about to such an extent that it would be wasting your time to repeat the many thrashed out and worn phrases. Every central station man knows that if he can conduct an electric garage where he can induce his merchants to come with their wagons and cart away the juice, this not only saves the cost of distribution lines but he has here a load absolutely under his own control in the matter of delivery. The majority of the wagons are charged after 9 or 10 o'clock in the evening, and once in a while a wagon might need boosting during the noon hour. Every central station man I have met admits that where a good vehicle charging business is obtainable there is not a more ideal load from a central station point of view.

Since entering this field I have noticed that the vehicle manufacturers look for the assistance and co-operation of the central station, and I found on my recent trip down the coast that every central station manager is fully alive to the possibilities of this new current-using device. The rates made for current leave no room for competition for either the horse or gasoline wagon in respect of cost of operation. If the manufacturer will now fulfil his part and bring the cost of the truck within the reach of the average merchant and not only of a prosperous few, the co-operation so attained would be most effective and complete. Our Canadian prices are at present too high.

Constructive Criticism of Electric Vehicle Conditions

Paper Read at the New England Electric Vehicle Convention

BY E. R. DAVENPORT

IT is unfortunate, in a sense, that most of the electric vehicle manufacturers today are in a healthy condition, because it is very difficult to get them to do some things that should be done on account of this. Many of them claim that their plants are operating twenty hours a day; that their buildings cover many acres; that their business is expanding tremendously, etc., etc.; and, after having been worked up to the point of expecting great things, you find that their output is but two or three trucks a day! Because of their large capitalizations, big overhead charges, etc., and small production, a large fixed charge has to be made on each vehicle. To this amount must be added the manufacturing cost and legitimate profit. Therefore, it is easily seen why the prices of electric trucks and pleasure cars are what they are.

Now the point I wish to make is, to urge you to increase your production. You will say, "Yes, fine, of course! We all know that. How is it to be done? If the central stations did thus and so we would have a big production."

If the manufacturer will improve his service and his salesmen he can very materially increase production without demanding so much from the central station.

I would like to call your attention to a manufacturer whom I believe you will all agree has made more money, and continues to, than any other manufacturer of gasoline cars. I refer to Henry Ford. This year, I am told, his output will be 200,000 cars. It seems to me that electric vehicle manufacturers should follow this example of tremendous production and I ask, was not price the biggest factor in causing this enormous output? Is it not also true that Ford's profits on the sale of each car are small? His overhead charge likewise? Notwithstanding, the total profits are stupendous because of the size of the production. Do you not agree with me that if an electric pleasure car could be made to retail for $1,250, many thousands of such cars could be sold?

I should not speak so strongly on this subject were it not for the fact that the prices of electric pleasure cars are being constantly increased. Why should an electric roadster increase in price year after year even with increased production? At a meeting in New York recently this subject was discussed by one of the most progressive central station men of this country. If I am correctly informed it was the consensus of opinion that an electric pleasure car should be produced for $1,000 and an investigation was started to determine the advisability of producing such a car.

Looking back over the past ten years we recall a little electric runabout built by one of the largest vehicle concerns in the country, which sold for $850. This car was equipped with a 24 cell battery, a motor of liberal size, made about 15 miles an hour, and, under favorable circumstances, could make 30 to 40 miles on a charge. There was nothing especially cheap about this vehicle. It was well painted and upholstered, and I believe that a large number of them were sold at that time. The lowest priced runabout manufacturd by the same concern today costs $2,250. Improvements have, of course, been made in that time, but the battery is only a little larger than in the $850 car. In fact the $2,250 vehicle has a 32 cell, 11 plate battery, a motor only a little larger, and a body of the modern gas car design which probably did not cost much more than the runabout built about ten years ago.

This same concern built this particular car, which now sells for $2,250, in 1911 and sold it at that time for $1,750. Only very slight improvements have been made since that time, consisting of a little better equipment and a change in the body design, which could not repre-

Frank Fairweather and His Standard Electric on the Road Up Signal Mountain.

Signal Point Inn, Chattanooga, Tenn., in a Standard Electric. Elevation 2,000 Feet.

Standard Electric Half Way Up Signal Mountain Road, 800 Feet Above Tennessee River.

sent any very great increase in factory cost; but, notwithstanding, the price of the car was raised in 1912 to $2,000 and in 1913 to $2,250, at which price it is now sold. Are we to expect in 1914 that this same car will be sold for $2,500? And in 1915 for $2,750? Evidently production cannot have a great deal to do with the price.

Let us take the case of the manufacturer of the gasoline car who, we will say, sold his product in 1911 for $1,750; in 1912 he would have reduced his price on the same roadster to $1,500, and might also give $100 worth of equipment free; and in 1913 he would build the same car, furnish an electric starter and lighting outfit, and, possibly reduce the price further. During the three years his production would probably have increased from 200 cars the first year to 500 cars the second, and perhaps 1,500 cars the third. Now, gentlemen, as a matter of fact, electric vehicle manufacturers are doing exactly the opposite. It is a good plan to meet competition on its own ground! If the electric vehicle manufacturer had viewed the situation from the standpoint of the gasoline car manufacturer there is no question but that the number of electric pleasure cars would, in the last three years, have increased several thousand per cent.

Electric Cars at the Savannah Electric Garage and Tire Company, Savannah, Ga.

There are many people who would like to own an electric runabout for use within the city, for the reason that, as they will admit, the cost of operating such a car is much less than their gasoline car. Nevertheless few people will make an investment of $2,250 for a runabout that could not be depended upon to go more than 75 miles on a charge. People of this class, usually, own a seven passenger touring car, suitable for use on long runs, but which is not at all handy for city work. As a rule they purchase, sooner or later, a gasoline roadster costing not over $1,250 and in this way save the wear and tear on their large car. Consider, then, that at the same price, there is little question but what they would purchase an electric runabout to do this work.

There seems to be no very good reason why an electric roadster should cost over $1,250. No electric pleasure car manufacturer makes his battery plates, and only a few assemble these plates. All of these batteries may be purchased from the battery manufacturers complete and ready for use at a price ranging from $350 to $450, according to their size, and from this price there is considerable discount. An electric vehicle motor suitable for a roadster can be purchased for $115. And the controller is equally inexpensive. Even the bodies do not represent a great deal of money and in many cases they are purchased from a body builder who makes nothing else. The frames are purchased from factories which make a specialty of building them, and in practically every case the axles are furnished likewise. The electric vehicle is, in almost every case, an assembled car. After adding together the value of all its component parts we arrive at a cost which does not justify a high selling price.

Considering these facts it does not seem that central stations are unreasonable if they ask that the high selling prices be reduced. I am convinced that the price of electric runabouts must be greatly reduced before they can become as popular as the modern gasoline car.

Considering the commercial vehicles, the prices charged, while high, are perhaps not as exorbitant as those charged for the pleasure vehicle. There is, as you know, a great future in the commercial end of this business, even at the prices now charged, but I believe that there must be made a very radical change in the methods by which these cars are sold.

SALESMANSHIP.

It is rather amusing to note that practically all of the vehicle manufacturers have sold express companies. This seems to be the stock selling argument among the trade. If we were to believe all that their salesmen claim most of the manufacturers of gasoline cars would be bankrupt by this time. I do not remember that I ever heard an electric vehicle salesman admit that any manufacturer of gasoline cars was making a profit in the truck department.

It is not enough to appoint one Boston agent for the sale of electric vehicles in the entire six New England states. While he may find such an agency profitable to him, the central station cannot be taken care of in a proper way, especially if it is located some distance from the city of Boston.

We have known same salesmen to approach a customer somewhat in this manner: "I would like to leave with you this beautiful hand-painted catalogue which is not given to everyone because they cost us 50 cents to print. When you have time you might find it interesting to look through this catalogue. I also have some photographs

Interior of the Savannah Electric Garage, Savannah, Ga.

that I carry around to show such interested persons as yourself. Now these electric cars are great things and I am quite sure you could use one in your business." And then he tells the story about the express companies. So and so company owns so many, etc. The customer asks "Where can I see one of these machines?" The agent will reply, "In Boston, the Blank Company is using three of them and in Portland there is another one." But in answer to the customer's question he states that he owns no demonstrating car and therefore cannot exhibit one.

While I do not wish to take the position that a salesman should beg a customer who is only slightly interested in any kind of a vehicle to receive a demonstration of his particular car, nevertheless I believe that an agent who is covering the entire New England territory should own at least one demonstrating car and should be willing to show that he can do the customer's work in case the man is in the market for either a pleasure car or a truck. Only in this way can the customer determine as to the fitness of the vehicle for his proposition.

In the gasoline end of the business there does not seem to be any question as to the advisability of making demonstrations. In fact it seems to be a universal policy among all gasoline truck dealers to demonstrate, while, on the other hand, with the electric vehicle dealers, it seems to be a big question in their minds as to whether they should or not.

In a city where there are only a few up-to-date electric trucks it is quite essential that we have something to show a customer and with which to prove that we can climb the hills and do the mileage that he requires in his business.

Dove Montgomery of Montgomery & Stone at the Globe Theater, New York, with His Rauch & Lang Town Car.

Many electric truck agencies work at a disadvantage in their efforts to convert customers to an electric truck due to the fact that their salesmen are more familiar with a gasoline car. The salesman's knowledge of the principles of electric motors and batteries is, in many cases, very small. Due to this fact, a great many people are still unconvinced of the merits of the electric vehicle. This condition was especially noticeable at the recent Boston Electric Show. One of our representatives visited about every booth where electric vehicles were shown and certainly was not impressed with the knowledge shown by many of the salesmen.

At one of the exhibits a certain prospective customer asked the salesman in charge a question relative to the mileage of a one-ton truck. The salesman stated that it was capable of 50 miles on a charge. The prospect instantly spoke up, saying that in the delivery of goods in his store it would be necessary for him to do 100 miles a day. Now, you can appreciate how impossible it would be for this man to run such a truck 100 miles a day and have sufficient time to make the number of deliveries required by the average department store. Very few gasoline cars used by the stores are able to make over 65 miles a day even on their suburban routes where they do not commence to deliver goods until within a radius of over 10 miles from the store. So this prospect was lost, on account of the salesman's lack of knowledge.

At another exhibit a salesman in charge was asked the weight of a 1,000 lb. truck which he was selling, equipped with a panel body and an Edison battery 60-A-4. He stated that "It weighed,—or at least he thought it weighed,—although he was not quite sure, but the battery must weigh at least 500 pounds." And he was somewhat uncertain, yet he guessed the car might weigh 1,800.

At still another exhibit the salesman was asked to explain the good points of his machine. He replied, "Well, you see it. It's right in front of you. It's a truck. Sure, it's all right. Runs by electricity." Now, gentlemen, of course you appreciate how this prospect must have been impressed with the advantages of the electric after such a complete explanation. Electric trucks must possess very great merit to sell in spite of such salesmanship as this.

We have all felt the result of your trying to obtain business on a basis of this kind. One of our customers, really anxious to purchase an electric coupe, made two trips to Boston, and, after talking with various salesmen, returned to our city and invested in a gasoline car. He believed that he should have an electric coupe, but he was unable to obtain any satisfactory information from the various salesmen regarding the mileage which he might expect from this or that make of car.

Another example of this kind of salesmanship was called to our attention. This particular salesman called at our office and asked to be introduced to some prospect; which we did, and learned to our sorrow the salesman's lack of knowledge about electric trucks. In fact he did not even know the price of the truck he was selling. He quoted a price of $3,100 on a car, the price of which was $2,800.

Some months ago we requested a vehicle representative to call on one of our prospects. After a delay of three weeks and after many letters had been written by us, the representative called, handing us our letters and asking what we desired. It so developed that this man had never sold electrics before in his life, was a gasoline car salesman, and probably hardly knew an electric when he saw one on the street. Is there any question about the matter of increased production with any such sales efficiency as this?

If the manufacturers will take each and every one of their salesmen in hand and equip them with the necessary knowledge, together with lessons on salesmanship, they undoubtedly can increase production. A salesman cannot sell another until he has sold himself. There is room right here for a number of sales in the sales force.

I believe sincerely that, as this is to be constructive criticism, calling your attention to matters of this kind will lead to a more highly trained sales force.

One 2-Ton and Three 1-Ton Baker Trucks for the St. Louis Board of Education.

I would like to make a suggestion relative to the publicity work carried on by this association and the magazines. If I am correctly informed I understand that provided a person read an advertisement and write to your association for information, your secretary has no data to furnish in response to this request, and finally refers this letter to the manufacturers and each and every one of them sends a catalogue.

I have been informed on good authority that the advertising of the Electric Vehicle Association has produced a large number of inquiries from prospective customers who asked for various kinds of data and information. And the association has made no provision to take care of the inquiries from its advertising campaign. It simply turns the names over to all companies with the result that the prospect receives 57 varieties of catalogues, each manufacturer stating that his is the best, etc. Upon receipt by the prospect of any such deluge of literature a man who was at all interested would certainly be obliged to delay action for three months or more to give him time to straighten the matter out to his satisfaction.

It is entirely the fault of the vehicle manufacturers that the public looks upon the electric vehicle as exorbitant in price. Without giving thought they have jumped into the same class of advertising that the gasoline cars have revelled in, confining their advertisements to pretty pictures of pretty girls stepping out of pretty cars into pretty flower beds, and never telling them how much it costs to run a car and why it is a practical family utility.

In their commercial car advertising, instead of sticking to facts and figures and telling what the various cars are doing for the various people, it is all technical talk and words. Their printed matter bespeaks expenditure. They use nothing but the heaviest coated paper, the most ornate printing and two colored pictures. The public knows that the public pays. In talking the electric vehicle the manufacturers talk negative arguments. They assert that the electric *will* run up hills; that it *is* a practical car. They are working on the defense a great part of the time.

What the people want is data. They want experience data. They want information that they can prove and suggestions that talk the language of their own business. They want service in every stage of the game.

The electric vehicle manufacturer apparently does not conceive this point. A hunter does not know which way he is going to point his gun until the rabbit jumps. The vehicle manufacturer insists that the rabbit must run in the way the gun is pointed. He believes that the vehicle man only knows the way in which the gun should be pointed.

Up to the present time we have never been able to ascertain exactly what constitutes the service the agent or the manufacturer should provide. In fact in only a few cases have we found that they provide any service at all. It is not unusual for an agent to sell an electric car in our territory and, after delivering the machine and showing the family how it should be driven, and perhaps giving one example of how it should be charged, leave the car to its own destruction. It has not been customary for the agent to visit a customer after a car has been sold, to examine the battery and other parts. If in town the agent might see the customer or might not. There does not seem to be any particular method of taking care of the customer after the car is sold.

In one particular case, after the agent had sold the car, it was necessary for our vehicle man to make ten calls to inform the customer about matters that should have been explained by the salesman, such as the use of distilled water, hydrometer, etc.

At a later date the customer reported one of his battery jars leaking and stated that the agent's representative had told him that we would be willing to replace this leaking jar. This, of course, could hardly be expected of us when you consider that the agent's profit was perhaps $500, as compared with the central station's gross income of $60 or $70 a year from that car.

In another case a customer reported that one of the cells in his car was leaking. The car had been in use only four weeks, and, although this is only a small matter and only a slight expense to the customer, yet it is one that should be taken care of by the agent who sells the car.

Another customer purchased a coupe and during the past two or three months in which it had been used it had been necessary for our vehicle man to make a number of calls. Only at our suggestion did the customer buy a hydrometer, syringe, distilled water, and a thermometer. All of these articles should have been sold to him by the salesman and properly explained. As a matter of fact the salesman in this case did not even know the proper charging rate for this particular car!

We have known of cases where representatives have advised customers to use Providence city water in the battery cells. This water is absolutely unfit for this purpose. Conditions of this kind should be ascertained before the customer is advised.

Another case is where a car had been over the road from Boston to Providence by one representative, a distance of about 48 miles, and was probably above 90 per cent discharged, and, in spite of the fact that even the battery boxes had a name plate on showing the proper current for charging, which called for initial rate of 25 amperes, the representative instructed a man at the garage to begin charging the car at 10 amperes and cut it out at 100 volts. On this basis it might have taken several days for a proper charge.

There are three parties vitally interested, or there should be, in the success of the electric vehicle. First the manufacturer. If his electric truck should fail, due to lack of care in keeping up any of its component parts, it would, of course, react against the further sale of such machines. The manufacturer, however, is not directly interested in the sale. The customer comes chiefly into contact with the agent representing the manufacturer. The agent's profit on the electric or commercial car costing $2,500, is 20 per cent or $500. Assuming that it cost 10 per cent to make a sale, this leaves the agent only 10 per cent of the selling price, or $250, as a net profit on the amount of money which he has invested and as a fund with which he may furnish the customer service. For this reason the agent does not feel that he can furnish the kind of service that the customer and the central station believe he should provide. As a rule the agent considers that a portion of the burden of giving this service should be shared by the manufacturer. How much of this expense does the average manufacturer assume, or is he willing to assume?

The battery manufacturer's interest in the car is probably as great as that of any of the manufacturers of the component parts of the car. While the value of his battery may not be more than 20 per cent of the total cost of the vehicle, yet with the various types of lead batteries, neglect and improper charging have been the cause of many failures in the past. The battery manufacturer will, as a rule, furnish as good service as the profit will permit. Most manufacturers have battery men who travel throughout the territory over which their batteries have been sold, whose duty it is to see their various customers and keep sufficiently in touch with them to prevent their product from getting into disfavor. These service men cannot hope to reach the retail customer owning but one battery and give him the attention which he requires.

The various central stations in whose territory the electric vehicles are sold are naturally interested in their success, and most central stations would be willing to do anything reasonable to promote this business.

When a vehicle man comes to a central station to talk co-operation, the usual thing he speaks about is lower rates. He blames the whole trouble on the fact that the central station won't give a low rate. He overlooks the fact that if he gave service and real co-operation the central station would be inclined to reduce the rate. Also it does not occur to him that the high price of electrics is caused mostly by extravagant methods which require a large margin to provide for the waste. If he would get together with the central station and turn out cars at a fair profit and a fair price and provide a good service, the central station would be quick enough to give a fair rate and then practical co-operation would be profitable to both.

We sell electric charging current in Providence at rates which in many cases will not permit us to give much service and still retain any profit from this class of business. There are a large number of factories which would pay us only 8 mills per kwh. for any current which they purchase for charging trucks or pleasure cars. There are many more who would pay us from 1.2 cents to 1.7 cents and some would pay over 3 cents. Our highest rate is 5 cents per kwh. which applies especially to pleasure cars whose power consumption is the least.

I believe that these low rates should encourage business in the territory served by our company and we hope that the manufacturers can get together on some mutual ground on which the battery manufacturer, the vehicle manufacturer, the agent and the central station would each assume its fair and just proportion of the cost of providing the kind of service which will make this business a success.

I have not gone into this matter sufficiently to know how this cost of service should be divided, but there is no doubt in my mind but that this is the ultimate solution of the problem.

I believe that with a service station, operated to furnish the finest possible care to every competing make of pleasure car and truck sold in a given territory, no matter who provides the service nor how the expense of it is to be divided, is a first essential to the permanent advancement and progress of the electric vehicle in which we are all so vitally interested.

In concluding let me say that just because it has been my hard task to criticize, please do not think me blind to the accomplishments you have achieved in creating your infant industry and standing it upon its feet, where it now receives the consideration and respect of the business world.

Finds Variety of Uses for Electric

In a late issue of *Suburban Life*, Jane Parsons Maynard tells an interesting story of the many uses to which she puts her electric.

"A friend of mine recently asked me if I thought an electric was worth while," she says. "It was in answering her query that I began to go over in my mind the different uses to which I put my car, and then I saw clearly how really indispensable my electric has become to me.

"We live in a suburban town, twelve miles out of New York City. On the place there is a good-sized garage, and here we keep both a gasoline touring car and my electric brougham. The touring car has always been a luxury with us, one that we have all enjoyed very much and have really used a great deal for making trips to distant points. My husband drives it himself when we go one these trips; I am not much of a machinist, and would be of little use in case of a break-down, so that when he is not around, the car stands idle.

"The cleaning of the gasoline car, we think, is a nuisance. As we do not keep a chauffeur, my husband takes care of the car himself. This is all right when we have been on a long jaunt across country—the car has earned its care then—but it does seem like a lot of bother, if we are only going out for an evening call. That's where my electric comes in.

"Always ready for use—the electric recharges automatically overnight—it is a simple matter to run out the brougham and drive to the neighbor's without any of the confusion and inconvenience incidental to preparing the gasoline car for use. And, after the evening's amusement is over the car is run back into the garage, perhaps a little dusty, but otherwise as neat as at the start. It is neither greasy nor smelly, nor does it require the going over, before further use, which the gasoline car demands.

"Our electric is used by the whole family through an average of fifteen or sixteen hours a day. Its day's work begins at eight o'clock in the morning. At that time my husband leaves for the city, and I always plan to drive him to the station, a mile away.

"I have two small children, both of whom attend a primary school in the village. It is considerably over a mile to the school from our house, and I drive them to school in the morning and at noon. They walk home for lunch and after the afternoon session, except in wet weather, when the car is really indispensable. I haven't a doubt that it has much more than paid its running expenses in what it has saved us in doctor's bills through prevented colds and sickness.

"After seeing the children to school I do my day's marketing, choosing the goods I want and having the clerk carry them right out to the brougham. In this way I am sure of getting what I order, besides being able to pick out the best for home use. Once the marketing is done and the purchases put safely away, I am free to carry out my programme for the day.

"Once or twice a week I drive into the city. It is a little over an hour's slow drive into town, and on the way there are none of the discomforts of train travel. With front and side windows down, I am able to enjoy the fresh-health-giving air and sunshine all the way in. And after I arrive in the city, I am saved all hurry and bustle of stuffy subway, elevated, or street cars. If I am on a shopping tour, I drive to the department store, leave my electric standing by the curb—the door locked as an additional safeguard—under the watchful eye of one of the porters employed by the store for this purpose, and go about my business. The brougham carries home all the purchases for which I may have immediate need.

"If I am going to make social calls during the afternoon, the electric is the easiest and most convenient way of carrying out my plan. Or, if I have guests coming from town for luncheon, I can meet them at the train and, if the weather is pleasant, take them for a drive through the country in the afternoon.

"At six o'clock my husband returns from the city and I plan to be at the station to meet him. He is tired after his day in town, and always welcomes the comfortable ride from the station to the house. After supper the car is again at our disposal for a social call, a theatre party into the city, or perhaps a drive through the fresh night air.

The cost of keeping an electric is surprisingly moderate, we have found. The average monthly charge for power amounts to about eight and a half or nine dollars. The cost for keeping in repair so far has been, altogether twenty-seven dollars.

"I have had my car two years now. In that time I do not think there have been ten days in which I have not been out several hours. I am in better health today than I have been for years past, my nerves are steady and I'm far, far happier than most women I know, largely because of my freedom from the irksome little duties of which my electric relieves me."

Electric Cars For Funeral Work

That the people of Grand Rapids, Mich., are going to have transportation equipage a little in advance of modern methods is evinced by the recent purchase made by Brown & Kilstrom of seven electric limousines of seven-passenger capacity to be used for funeral work and for order business, such as weddings, parties, opera, calling, shopping and afternoon pleasure drives.

After thoroughly looking over the field the order for building these was given the Baker Electric Company of Cleveland in January, and the vehicles will soon be ready for delivery.

The theory advanced by the purchasers is that an electric vehicle is noiseless and dignified for funeral work, whereas the gasoline machine is more susceptible to motor and tire trouble, and from standing on the street in cold weather the noise that cannot be avoided in warming up the motor for a start would be objectionable when a number of machines were lined up for funeral cortege.

An electric hearse is in course of construction for this firm, and the finest line of vehicles provided for any city in the country will be on our streets within a short time, which this firm believes will be appreciated by the people in preference to the present necessity of engaging horse-drawn vehicles. With this equipment in use, friends of the family will be inclined to use their own machines for the funeral cortege, whereas with horse-drawn vehicles predominating, the owner of a machine is disinclined to use his own conveyance on occasions of this character; in other words, it will be very appropriate for either gasoline or electric vehicles privately owned to fall in line with this class of conveyances.

It is said that this is the first electric fleet made by any manufacturer for this purpose and good results are being anticipated through the innovation that Grand Rapids is to have. These machines are to run 60 miles on a charge and, as the illustration indicates, the top lets down for pleasant driving.

Sacramento to San Francisco

"To the many electric car owners in Sacramento I can say that one of the most enjoyable trips imaginable can be made to San Francisco in an electric," says C. A. Lamus. "I had never been over the road before and was most agreeably surprised at the ideal conditions. Any electric car that has a capacity of 60 miles per charge can make the trip without difficulty.

"Leaving Sacramento early in the morning in my Baker Victoria, which is more than two years old, I arrived in Stockton at 7:55 a. m., after a run of a little more than two and a half hours. I did not make any effort to save power, but kept the car on high speed all the time. I put the car on charge at an electric garage until 10 o'clock, and after losing half an hour to some photographers who heard of my intended trip, I left Stockton at 10:30 a. m. Tracy was passed at noon, Altamont at 1:12 p. m., arriving at Livermore at 1:50 p. m. The grades approaching Livermore were passed with ease. By my odometer Livermore is 43 miles from Stockton. Here I again put my car on charge for a little more than an hour, leaving Livermore at 3:25 and arriving at Dublin at 4:05. Then began the ascent of the Dublin pass, which is the heaviest climb on the trip. This ascent was made without difficulty. From the summit into Oakland along the Haywood boulevard was the most pleasing part of the journey. Oakland was reached at 6:30, with the little car looking as clean as though it had never left Sacramento's paved streets."

Standard's Cleveland Branch Enlarged

The Standard Electric Car Company, which has conducted a branch at 2045 Euclid avenue, Cleveland, for the past year, has found it necessary to move into larger quarters. It has leased a large show room at 2025 Euclid avenue and will maintain there a salesroom and repair station, where competent mechanics will give service under the direction of George C. Deffrane, Cleveland branch manager. Sales-manager Morgan says that within the past few months business has been more than gratifying. There is no doubt that in its new quarters the popular priced electric will continue to do an ever growing business.

EDITORIAL SECTION

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CHICAGO, JULY, 1913

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ELECTRICS IN ENGLAND.

ELECTRICS in Great Britain have been notable for their scarcity. It is, therefore, pleasing and encouraging to observe evidences of an awakening in that quarter. In this issue we publish an interesting account of a run from Dumfries to London, 360 miles, in an electric, as well as a paper on the general subject of electric automobiles which was read before the Incorporated Municipal Electrical Association of Great Britain. The discussion which followed the paper and the publicity given the tour, seem to promise an excellent field for the exploitation of the electric.

Great Britain and the Continent are famous for their magnificent roads. They are covered with a network of electric light and power lines. The better classes are pleasure-loving and accustomed to luxury. The automobile as an institution is established. Nothing, therefore, stands in the way of the electric but unfamiliarity with it, and a consequent doubt of its abilities, or perhaps a failure to think of it at all.

On the Continent there is, as yet, no sign of an electric vehicle awakening. The spirit of the papers presented in this issue show, however, not only that England is ripe for development, but that the action has really started.

We venture to predict that before many years have passed the electric vehicle development of the tight little isle will rival that of "the States"; and the whole continent of Europe offers too good a field to remain long in its present benighted condition. Everywhere that electricity is used—and that means the whole of the civilized world—the electric car is bound to become popular.

THE TRUCK MAN'S SLOGAN.

A SPEAKER before the annual meeting of the Electric Vehicle Association's Chicago Section declared that "economic law" is always behind the electric touch, making its selection for its particular work inevitable. The truck buyer may experiment with horses, steam and gas; but that is because he is not familiar with economic law. Ultimately, when he has grasped its significance, he must get an electric.

The necessity of observing economic law marks the essential difference in selling conditions for electric trucks and pleasure cars. The electric pleasure car buyer as a rule wants luxury first and economy afterward. Of course he is interested in costs of operation and maintenance; but the figure is not vital to the decimal point. If the cost approximates that of a gas car of similar quality, he is satisfied.

Perhaps the fact that women are largely the actual buyers of pleasure electric accounts for the fact that luxury, convenience and beauty are the factors determining selection. Business men, even when buying pleasure cars, are showing yearly a keener interest in economy. A certain low-priced gas car of few claims to beauty has found fast friends among men whose means would warrant their use of a much more expensive vehicle were it not for their appreciation of "economic law."

Besides the items of luxury, convenience, etc., the electric pleasure car buyer buys because it is *electric*—a word that holds more romance for the layman than any other technical or scientific term. But the truck buyer is influenced by neither beauty nor luxury, romance nor vanity. He cares not whether his goods are transported on the heads of human carriers, by wheelbarrow, horse, steam, gas or electricity. His interest is concentrated on cost—to the decimal.

Not every user of transportation, of course, has made a study of the economics of his requirements. A good many adopt a new system because a competitor or a friend has done so. A good many will confess to favor or prejudice for one system or another without any logical basis for the attitude. But above all argument or question is the fact that the large users of transportation, those who have really made a study of efficiency, have adopted the electric truck. It is not a question of preference or choice; they *must* use electrics. They cannot afford to use anything else, without courting the accusation of wastefulness.

And that is what "economic law behind the electric truck" means. It means that if there were no supply, the demands of efficiency would force one. And it means unbounded future prosperity for the manufacturers of electric trucks as the principles of economic law and the absolute necessity for efficiency become more apparent to modern business.

CONSTRUCTIVE CRITICISM.

ON ANOTHER page appears a paper by E. R. Davenport entitled "Constructive Criticism," which was read before the recent convention of electric vehicle men at Boston, Mass. The paper is long but genuinely interesting, because the author is very much in earnest in his attempt to suggest a remedy for what he regards as obstacles to the growth of the industry.

It is not our purpose to attempt a criticism of Mr. Davenport's criticism; nor do we, on the other hand, wholly endorse his views when we print his paper. Although adopting the viewpoint of a disinterested bystander, he is a central station man; his arguments are convincing, but we doubt not that an electric vehicle manufacturer could prepare a paper of the same title which, attacking the subject from a different angle, would be just as persuasive.

Modern industry holds few examples of co-operation more beautiful than that of the electric vehicle manufacturer and the electric central station. Unfortunately, however, this condition exists in only a few large cities. To those central stations which have devoted thought, energy and money to the electric vehicle is due the gratitude of the trade. But the fact remains that the majority of electric light and power companies are so indifferent to the success of the electric car that they use horses or gas cars in their own work. This is the condition that *must* be remedied before the manufacturers can experiment to determine the advantages of large production and lower price.

AS A RIVAL OF THE GAS CAR.

MEN who follow closely the evolution of the automobile trade are agreed that every year sees the electric car growing in favor and realize that as rapidly as its operating radius is further extended, both by the improvement in batteries and the extension of convenient charging stations, it is bound to progress. It is somewhat surprising, however, and indicative of the rapidity with which these improvements are being made, to hear an authority predict so rapid an advance as to make the electric the rival of the gas car in four years. Yet in a recent address in Boston T. H. McGiehan, general manager of the Motz Tire and Rubber Company, said, "It is not a stretch of the imagination to say that electric vehicles will in four years be as popular as the gasoline vehicle today.

"With the coming of good roads and the standardization of batteries, it will be no unusual thing for owners of electric vehicles to make long tours. Trips over 100 miles in length are being made today on one charge. Already charging stations have been placed at intervals along many of our highways so that car owners are enabled to obtain recharged batteries, just as you obtain gas tanks.

"The car owner would, of course, dislike to exchange a discharged battery in good condition for a recharged one of inferior quality. So the electric vehicle industry is bound to come to standardized batteries. It is not at all improbable that electric-car owners may be enabled to get 'canned' electricity just as easily as you can get 'canned' light now.

"Conservation of power is, of course, the main factor in the maintenance of an electric car and few people realize the bearing tire efficiency has upon the saving of the battery charge. When the tire absorbs road shock all the power is used in carying the car in an onward instead of an upward direction."

NEW BATTERIES PART OF SERVICE.

Selling an electric car without a battery and then charging the owner a given rate for battery service, is the unique idea which a Hartford, Conn., dealer has found to pay. And the owners so supplied with service find the arrangement an equally satisfactory one. The dealer is closely associated with the local electric light and power company, and thus the arrangement is an especially convenient one. The operator may use his car 24 hours a day, the company providing a second battery when the first gives out. Two changes a day are often made by cars doing a big mileage, the charge being based on mileage. For example, a 750-pound car is supplied with battery service at 5½ cents per mile provided it is operated 500 miles per month. If the car runs, 1,500 miles the charge is 3 cents and for 2,000 miles 2.6 cents per mile. The truck owner's advantage is that he always has battery service. Edison batteries are used in this case, and it is figured that the owner saves $12 a month on a 1,000 basis.

SECOND-HAND PROBLEMS.

In address made before the Chicago section of the Electric Vehicle Association, Ralph Temple strongly denounced the "season model" system followed by the majority of automobile manufacturers. Attaching dates to a car, such as a "1912" or "1913 model," he asserted, should not be allowed, for it gave the public a false idea of the ability of a car simply for the reason that it was a season or so older than a car of another and inferior make which sold at the same price. Other things being equal, an old car in good condition should receive a better rating than a more modern car in bad condition.

In the course of his talk Mr. Temple, who is a veteran automobile dealer, paid a glowing tribute to the future of the electric automobile.

A Typical Department Store Garage

One of Marshall Field & Company's Electric Stations in Chicago

BY W. R. CONWAY

THOSE interested in the development of the electric vehicle for commercial service point with pride to the fact that Marshall Field & Company, Chicago's largest department store, employs 139 electrical commercial cars in delivery service. These cars were not all purchased at one time but have gradually replaced horse-drawn wagons, after the initial installation demonstrated to the company the economy and advantages of the electric. The advertising value of the electric has also a strong appealing force for the department store. It must be admitted that customers of these stores are better pleased to have their goods delivered by electric wagons than by any other mode of delivery. No woman enjoys receiving a package that carries a heavy scent of gasoline, or the strong smell of the stable. The electric has also the excellent merit of noiselessness. The customer before whose door the electric machine stops is not jarred by the nerve-racking chugging so common with the gasoline machine. The department store has come to see that extension of business is sure to result from the additional working capacity of the electric.

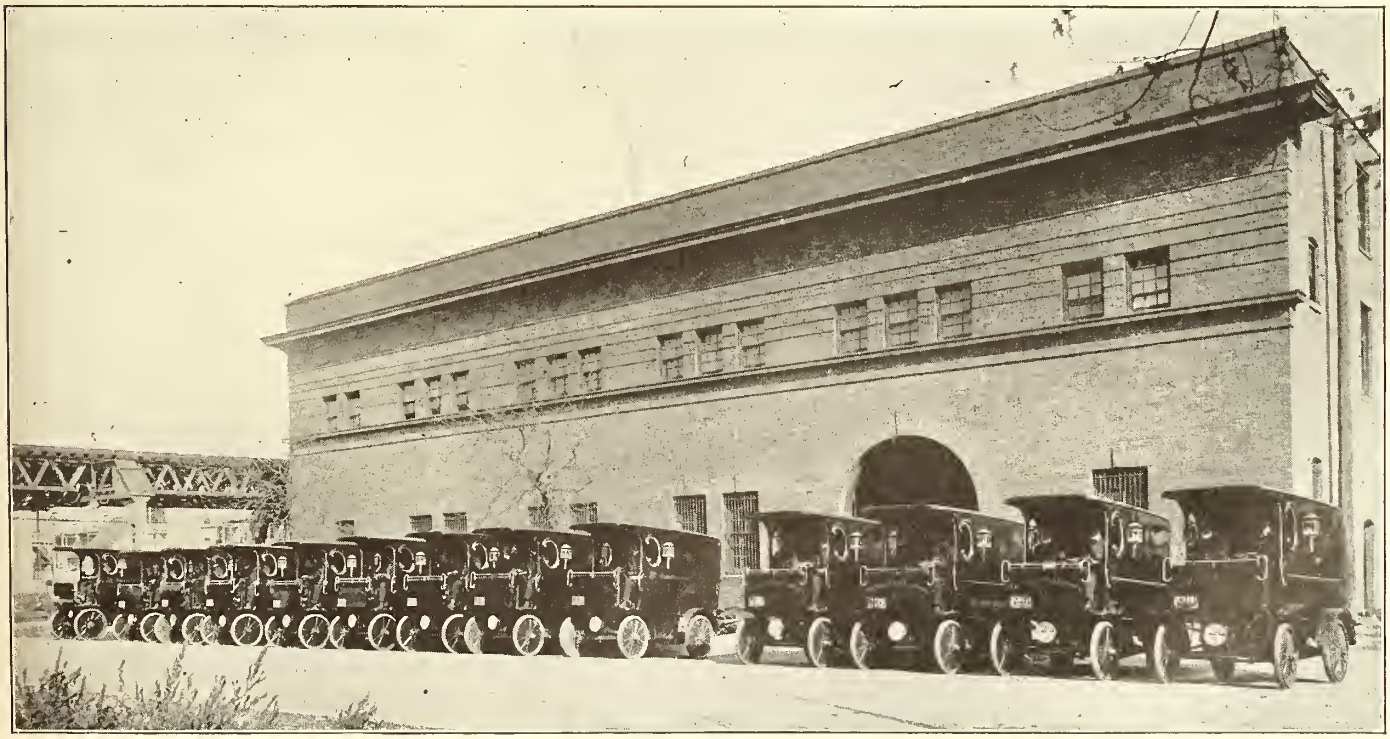
For caring for the 139 vehicles in its service Marshall Field & Company has erected seven garages, located in verious sections of the city and containing charging equipment aggregating over 1,500 kilowatts in capacity. All energy for battery charging and other purposes in these garages is purchased from the Commonwealth Edison Company at a special off-peak rate, which stipulates that no energy be used between the hours of 4 and 8 p. m. during the months of November, December, January and February.

The garage located at the corner of Sixty-third street and St. Lawrence avenue, is typical of the company's stations of the older type. The building is a modern two-story brick fireproof structure 200 feet wide by 100 feet deep. An idea of its appearance can be obtained from the accompanying exterior view. Before the advent of the electric this building was used as a barn for the horse-drawn wagons, the horses' stalls being located on the second floor. It is interesting to note that twice the number of electrics can be cared for that was possible with the old wagons.

The charging equipment and switchboard is located on the second floor. The former comprises a 75-kilowatt motor-generator set of the General Electric Company's manufacture. The switchboard is of the most modern type, containing individual watt-hour meters for each charging circuit. It is a six-panel board comprisfour charging panels and two control panels.

The charging panels are equipped with 20 charging rheostats, four of which are for boosting up to 115 amperes, the others being designed for 75 amperes. As mentioned, each charging circuit is provided with a Sangamo garage-type meter for measuring the current delivered to each battery. The meter pointers on the main dial are reset to zero after each charge and totalizing dials keep a continuous record of the energy measured. By the use of these meters the garage superintendent has a means of observing closely the condition of each battery and, also, the company can keep accurate records of the cost and performance of each vehicle.

The generator panel contains an inverse current



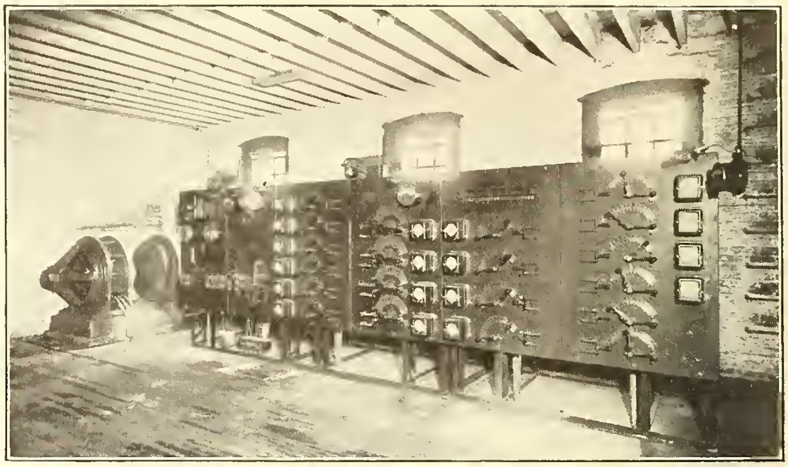
One of Marshall Field and Company's Seven Chicago Garages for Electric Delivery Wagons and Trucks. This One Accommodates Twenty Wagons at Present, But Has Room for More. The Company Has 139 in Service.

circuit-breaker and generator field rheostat. The starting compensator is mounted on back of the motor panel which also contains Edison meters and a printometer. The Edison service is three-phase, 60 cycles, 220 volts.

On the first floor there are installed three 50-ampere mercury-arc rectifiers which are used for boosting and for day charging.

All wiring in the garage is carried in conduit. The 20-charging circuits are run to junction boxes, suspended from the ceiling and from these, cables are run to the charging plugs. One of the accompanying illustrations shows the switchboard and motor-generator set.

At present 20 one-ton Walker delivery wagons are charged in this garage but there is space for more. As in the company's other garages performance records are kept of all cars.



Charging Panels in the Marshall Field Garage.

Ohio Railway Finds Electrics Useful

The Northern Ohio Traction and Light Company, Akron, Ohio, purchased sometime ago from the Baker Motor Vehicle Company, Cleveland, Ohio, one tower wagon and a one-ton and a two-ton line truck of the storage battery type. These trucks have been stationed in Akron and replaced two two-horse wagons, but the railway company states that since installing the trucks it has increased construction work fully 100 per cent. The company expects the trucks to take care of all new construction for some time to come as they are not by any means running to capacity even with the present doubled work. The operating radius of each of the trucks is sixty-five miles on a single battery charge, but the batteries have not been exhausted since their installation. Although Akron and the surrounding country are very hilly, the average daily run has been from thirty to thirty-five miles. One of the special duties of the trucks in construction work has been to pull and stretch cables over cross-arms.

The equipment of each truck includes a battery of forty-two cells, a series-wound motor having 300 per cent overload capacity, a Renold silent chain from the motor to jack shaft and two roller chains from jack shaft to rear wheels; also regular and emergency brakes. The tower wagon has a body of 144 by 60 inches, with 14 inch sides. It is equipped with a McCardell tower which stands twelve feet from the ground when lowered, and seventeen feet and nine inches when raised. A twenty-four-inch railing incloses the platform. The tool boxes are so arranged that there are seats for ten men when the truck is completely loaded. The one-ton line truck has a body of 144 by 60 inches and has 14-inch sides.

A special feature in the equipment of these trucks is a lamp socket under the driver's seat, where a lamp cord can be plugged in, thus affording a light that can be carried up onto the poles by linemen when working at night. The trucks are garaged in a storage shed belonging to the railway company and they are charged from an exciter dynamo in the power plant so that the cost of charging current is a small item.

Eva Tanguay Buys an Electric

During Miss Tanguay's engagement at the Shubert Theater, New York, she was so impressed by the lines of the new Argo roadster that she called up the De Luxe Automobile Company, 3104 Locust street, the distributers for Argo cars in this territory, for a demonstration, which was made from the Shubert Theater to the "Chicken Farm."

Before starting she agreed to purchase the car if this distance was covered within one hour. Mr. Brockman drove to the "Chicken Farm" with Miss Tanguay and her manager, Mr. Arthur Klein, in forty minutes. These cars develop about thirty miles an hour and average about 100 miles per charge.

Miss Tanguay immediately purchased the roadster and said she was more than satisfied with the demonstration and delighted with the lines of the car, for the reason that it had the appearance of a regular gasoline roadster; also having the foot control and wheel steer. This car was shipped to New York last Monday.

Woods Improvements

Improvements are coming fast on Woods electrics. Following closely after the announcement of the frameless glass windows as an exclusive Woods feature come the "domes," a new window-raising device to take the place of the old-fashioned window pulls for raising and lowering the glass in the car doors.

On the new Woods model this is accomplished by means of a small handle mounted in the center of the door inside just below the window.

The window glass is easily raised and lowered by turning this handle. In addition to its neat appearance the advantages of this device are the ease with which it is operated and the fact that the window is automatically locked at any height.

Standard Car in St. Louis

S. F. Patchin, special agent of the Standard Electric Car Company of Jackson, Mich., which recently placed its agency with the T. J. Moss Motor Car Company, 4374 Olive street, St. Louis, Mo., is spending a week in St. Louis, meeting owners of the car and instructing them in its care and use.

T. J. Moss is preparing to push the car, the low price of which makes its appeal to persons who found the higher priced electrics beyond their means. The car is a roomy four-passenger, clear-vision coupe. Patchin reports that the recent connection of Hayden Ames with the Standard Company as general manager has attracted wide attention among automobile men.

Electric Automobiles in England

Paper Read Before the Incorporated Municipal Electrical Association Convention, London

BY W. H. L. WATSON & R. J. MITCHELL

BRITISH engineers may bear in mind that, soon as production exceeds demand American manufacturers may start plans for an electric vehicle crusade in Great Britain. As a matter of fact, such a crusade would present fewer difficulties in this country than it must have met with in America. Roads are admittedly much better in Great Britain than in the States, labor costs are about half, while electric energy is cheaper. In view of these facts, the authors wish to express earnestly the sincere hope that British engineers and manufacturers will not allow the splendid opportunity which lies near to escape their observation merely because a few pessimists think "there's nothing in it." It is felt that no time was ever more opportune than now for a thorough discussion of the problems involved in the organization of a British electric vehicle industry. Very particularly interesting will be the views of central station engineers on the possibilities of supplying energy at special cheap rates for charging during off-peak hours. Power at a low price is a *sine qua non* for a really successful "electric" movement to become an actuality in Great Britain. Central station men are, therefore, interested more intimately in the new industry, which will be not only a branch of the motor-car business, but equally an expansion of the electric supply engineer's field of activities. This applies practically to every supply station in Great Britain.

TABLE I. AVERAGE CHARACTERISTICS OF AMERICAN COMMERCIAL ELECTRICS IN 1913.

Loading capacity in lbs	300	500	750	1,000	1,500	2,000	3,000	4,000	7,000	10,000
Vehicle weight in lbs	2,200	2,650	3,000	3,450	3,500	4,300	4,700	6,000	8,500	10,850
Battery capacity in amp. hrs	150	150	150	150	150	225	225	300	375	450
Battery weight (lead) in lbs	1,260	1,260	1,260	1,260	1,260	1,800	1,800	2,500	3,150	3,800
Battery weight (Edison) in lbs	840	840	840	840	840	1,260	1,260	1,800	2,250	2,700
Average miles per charge	70-80	75	65	55	50	50	45	40	35	35
Maximum speeds on hard level asphalt in m. p. h.	20	17.5	16	15	14	11	10.5	10.0	8	6.5
Speeds recommended by Electric Vehicle Association in m. p. h.	20	20	16	13	11	10	9	8	7	6

Note.—Battery equipments are quoted pro rata of their average weight and capacity.

A survey of the electric vehicle field reveals the existence of more than 130 separate models now available on the American market. Of these, about half are pleasure automobiles. Confining attention for the present to industrial vehicles, it is noticeable that this range of cars includes parcel vans of 500 lb. capacity at one end and coal trucks carrying 10,000 lb. at the other end of the list, vehicles with graduated loadings above and below the limits stated. Table I. gives the average figures relating to the principal features of about 60 models of American industrial electrics. Included are the speeds recommended by the Electric Vehicle Association for various weights of chassis. These speeds were arrived at after very carefully considering all limiting factors, technical and commercial; they represent, therefore, the most economical practice. It needs no comment or explanation for any business man to see that cheap ton-mileage depends on employing fairly heavy trucks. This economical feature is, of course, not alone applicable to electric vehicles, a somewhat similar condition obtains with petrol machines, though nothing like so decidedly. American practice inclines to the two or three tonner for heavy haulage, using the lighter types of vehicles for services where very cheap ton-mileage is of no account. For an extreme example the drapery business suffices. In such a case a very light car would be economical; and, in fact, all despatches of numerous packages of value can be most economically dealt with by the lighter vehicle. Heavy stuffs, such as coal, cement, bricks and the like, demand a truck big enough to deal with large quantities in one haul. Some reference to speed is desirable at this point. The casual critic seeks generally to damn the electric by accusing the whole class of vehicles with deficient speed and inability to climb hills. Neither of these defects exists in practice, though the electric does not claim the speed of its far more highly rated petrol competitor. Speed is purely a question of battery power and motor rating; and as commercial aspects towards engineering demand always a compromise, it is found the most economical to make the commercial electric a moderate speed vehicle able to maintain a uniform speed for a reasonable distance, this latter varying from 35 to 75 miles per single charge, according to circumstances. Moderate and uniform speed means greatly decreased wear and tear on all parts of the chassis and transmission, including tires, which are usually guaranteed an extra 20 per cent in mileage for use on battery cars.

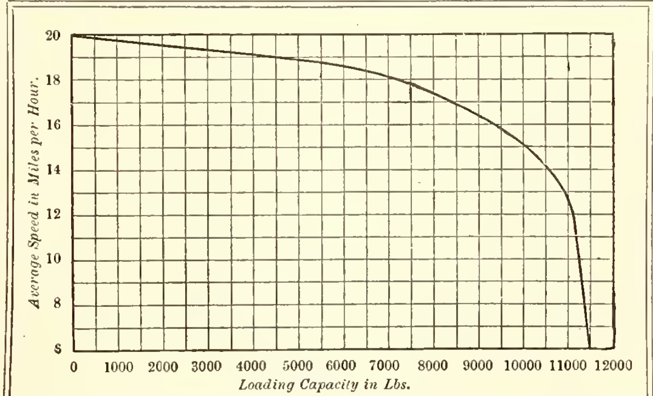


Fig. 1.—Curve Showing the Relation Between Speed and Carrying Capacity.

Already there are well authenticated cases of electrics having been in active commission for 12 years and still going well, for all their service. Although it is now usual to assess the life of these machines at 10 years for depreciation purposes, there is little doubt that experience will prove that this duration of usefulness will be far exceeded in actual practice. The mechanism of the battery vehicle is reduced to ideal simplicity, effecting the elimination of hundreds of parts, many of them reciprocating, and subjected, therefore, to rapidly alternating stresses. No such shocks as occur with a high speed engine can take place with the electric, excessive speed being possible only down hill. Neither can a driver of an electric damage his machine by racing home with the vehicle empty, as it is impossible to speed up beyond the limits originally imposed by the designer. For traffic work there is little economy in operating a car capable of a speed greatly in excess of that of the average traffic stream. Therefore it is clear that moderate speed combined with a fairly uninterrupted progress is the condition at which to aim. The electric scores heavily on that heading, and, contrary to the belief of many theorists, shows itself also well able to climb severe gradients.

TABLE 11. DATA APPLYING TO INDIVIDUAL EDISON CELLS.

Type of cell	B2	B4	B6	A4	A6	A8	A10	A12
Weight, in pounds	4.6	7.4	10.5	13.5	19.2	27.5	34.0	41.0
Weight, in pounds, including crate	5.5	8.7	11.8	15.0	21.0	30.3	37.5	45.0
Ampere-hour Capacity—								
Rated capacity, ampere-hours	40	80	120	150	225	300	375	450
Normal actual output (seven-hour charge), ampere-hours	42	84	126	168	252	363	420	504
Maximum output on overcharge, ampere-hours	48	95	142	190	285	380	475	570
Watt-hour Capacity—								
Rated capacity, watt-hours	48.0	96	144	180	270	360	450	540
Normal actual output (seven-hour charge), watt-hours	50.4	101	151	202	302	403	504	605
Maximum output on overcharge, watt-hours	57.0	114	171	228	342	456	570	684
Output per Pound of Cell—								
Rated capacity per pound, watt-hours	10.4	13.0	13.7	13.3	14.1	13.1	13.2	13.2
Normal output per pound (seven-hour charge), watt-hours	11.0	13.6	14.4	15.0	15.7	14.7	14.8	14.8
Maximum output per pound, watt-hours	12.4	15.4	16.3	16.9	17.8	16.6	16.8	16.7
Discharge Rates—								
Normal (five-hour) rate of discharge, amperes	8	16	24	30	45	60	75	90
Maximum rate for intermittent discharge	50	100	140	180	225	300	350	400
Watt equivalent of normal ampere rate	9.6	19.2	28.8	36	54	72	90	108
Watt equivalent of maximum ampere rate	36	72	105	133	187	249	301	352
Average Voltage—								
Discharging at normal (five-hour) rate, volts	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Discharging at one-fifth normal (25-hour) rate, volts	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
Discharging at five times normal (one-hour) rate, volts	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Internal Resistance—								
Mean effective internal resistance, ohms	0.012	0.006	0.004	0.003	0.002	0.0015	0.0012	0.001
Electrical Efficiency—								
Normal ampere-hour efficiency, per cent	79	79	79	79	79	79	79	79
Normal watt-hour efficiency, per cent	60	60	60	60	60	60	60	60

Successful vehicle service entails batteries of the lightest possible construction consistent with durability and high specific energy output per pound. In the early days plates of the pasted type were employed mounted in an open containing case of ebonite. The output of such batteries hardly exceeded 6 watt-hours per pound, and was sometimes less, while their life was a little over 100 complete cycles of charge and discharge. Considering that in the year 1900 a 44-cell battery of 150 ampere-hours nominal capacity cost about £100, there is little wonder that electric automobile progress languished, at all events in England. The defects of early accumulators are so well known that any further mention of them is uninteresting. Beyond stating, therefore, that storage batteries appear to have proved what a chasm can separate ideal theory from even moderately good practical attainment, nothing more needs to be said. The vanished companies for battery car exploitation bear witness to some of the failures of the past. Lest it be assumed that the lead-sulphuric accumulator is still in its original elementary state of crudity, let it be understood at once that quite the contrary is true. The modern electric vehicle accumulator, as developed largely by American engineers, is a triumph over mechanical and chemical disabilities which can only be paralleled in the early troubles of carbon glow-lamp manufacture. Improvements have become effected, not by any radical departure in design or revolutionary discovery, but rather because there has been applied every available bit of knowledge that could coax such an unsatisfactory metal as lead into performing its dual function of resisting stress, yet giving sufficient surface for efficient energy output without undue weight.

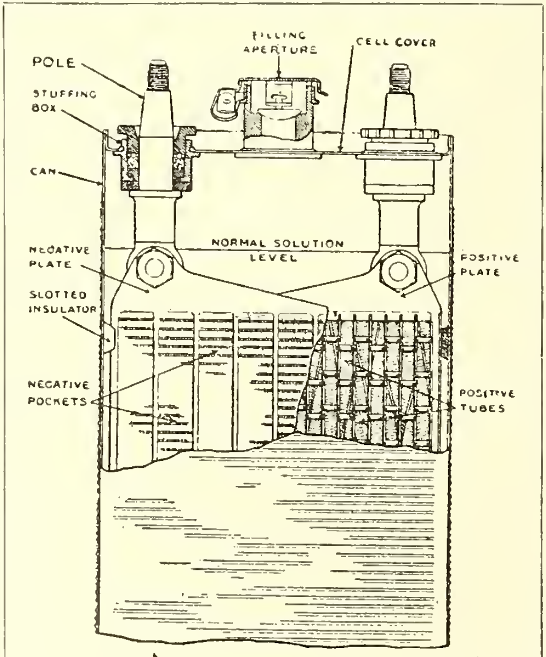


Fig. 2.—Internal View of the Edison Accumulator.

For practical service there are but two types of storage battery in present-day usage. These are the lead sulphuric acid cell, developed mechanically to a high degree of perfection considering the difficulties of so doing, and the nickel-iron alkali cell, of which the Edison is the best-known example. As matters stand, the modern vehicle battery is a compromise between lightness and durability. The usual plan is to make positive plates a little over ⅛ inch thick and negatives somewhat thinner. The pasted type of plate finds most favor, though in some cases a specially light Planté plate has given good results, in spite of the greater weight entailed, a longer life making a small concession in weight more than justified. Spacing is arranged to be a minimum that considerations of electrolyte volume permit, while the specific gravity of the electrolyte is sometimes as high as 1.3. Separators of perforated sheet ebonite are often employed fully encasing the positive plate in some instances. American practice also favors separators of specially impregnated thin wood sheets, these having proved cheaper than ebonite and equally effective. Celluloid has been found unreliable for traction accumulators, as it eventually be-

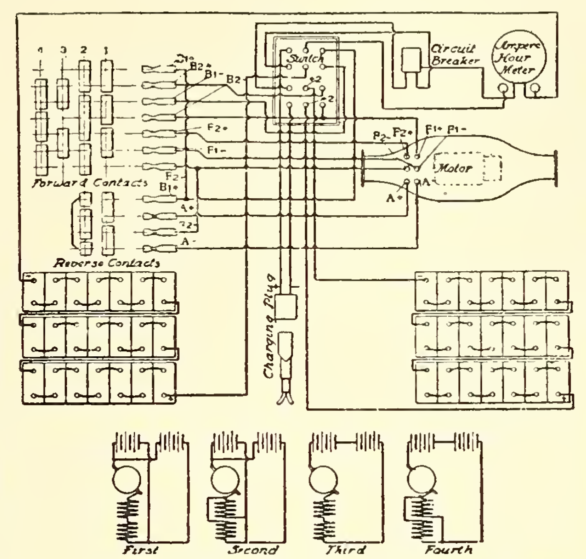


Fig. 3.—Typical Controller-Circuit Diagram of Vehicle Motor, Battery in Parallel on First Two Speeds.

comes attacked by the strong acid. Considered as a mechanical job, the lead battery for automobiles has improved immensely. In place of the anciently used open container, a sealed-in case is nowadays employed, the top being liquid-tight yet removable.

The actual life figures for any condition of service seem to be dependent largely on circumstances. Thus there are some well vouched for instances where accumulators have given 6,000 or 7,000 miles of running before becoming too much reduced in capacity for further economical service. On an average, it would apparently be true to assign a life of 3,000 or 4,000 miles to a lead sulphuric battery in automobile service. A prominent English company running a fleet of private cars in London reckons usually to get 3,000 miles' life from positive plates, while negatives last sometimes as long as 6,000 miles. In this example the conditions are rather exacting, as it is a common occurrence for the current demand to equal a one-hour discharge rating. The modern lead battery is remarkably compact, and in average cases can store a watt-hour for every cubic inch of the space occupied. This means that 2 hp.-hours can delivered at the road wheels for each cubic foot of battery, weighing on an average from 180 lb. to 200 lb. In emergency, the lead battery will give a surprising power output for short periods. On a recent test of an exide battery, a momentary discharge rate equal to 75 h.p. was obtained from a battery weighing only 1,500 lb.

The Edison accumulator, an internal view of the latest type, is shown in Fig. 2. Very prolonged tests indicate that the Edison A type battery, the type that has now been going since 1908, possesses some unique features, chief of which are its nearly perfect immunity from the effects of mechanical abuse, the fact that no troubles, such as plate buckling nor shedding of active material, occur, and the absence of injury due to severe overcharging or discharging both as to duration and degree. Table II. gives data relating to the various types of these cells.

At first sight there would appear to be no reasons why an electric should not be controlled by variations of voltage obtained by grouping the battery in successive arrangements of increasing voltage. This could apparently be done quite simply by dividing, say, a 60-cell battery into some series, so that four voltages become available for speed control. Enticing as such a system appears, it yet proves to be rather complicated in practice, due to the large number of leads involved and the somewhat heavy currents which must be broken on the controller. Moreover, the last step is somewhat of a jump as compared with previous gradations, being inevitably 100 per cent increase over immediately previous voltage conditions. This would entail rather jerky running when changing from speed 3 to 4. Further objections to the pure-series parallel system of control lie in the effect of discharging batteries of the lead type in parallel, resulting in harmful inequalities of discharge towards the end of the output. With a lead battery this treatment may cause injurious sulphating, and not a uniform behavior of the cells as a whole. The objection, however, is claimed to have no weight in the case of nickel-iron cells of the Edison type, as these cells are quite unaffected by arduous discharge conditions amounting to short-circuiting on the one hand, or being left on open circuit for indefinite periods. From the efficiency standpoint the series-paralled method of control is much in advance of the systems using resistances which have displaced it, and future practice might reinstate the system with considerable advantage if mechanical difficulties be overcome. Modern vehicle motor controllers are mostly of the continuous torque drum type, operated by a lever, geared up in its effect by meshing with a small spur pinion on the drum shaft. Usually a series of five or six speeds is provided, the highest being that obtainable with full battery voltage across the motor together with a field partially shunted by a resistance of the iron-grid type. With a few exceptions, the springiness of the contact fingers is relied upon to give an adequate contact on the drum sectors, the current being broken on the drum itself. This is not the best practice, and could be much improved by arranging to operate a carbon break switch immediately after a drum contact has been ruptured. Another method, actually used on one car, effects the same result by using a magnetic "blow-out" coil, the field of which "wipes" out injurious arcing. Fig. 3 gives one method of speed control which may be regarded as typical of average practice; the small serial drawings will make the system self-explanatory. As a rule the controller handle is operated in a horizontal plane underneath the steering wheel, a press button being incorporated on the end of the handle to actuate an electric warning signal. Other refinements include the automatic breaking of the current when putting on the emergency brake, which latter, particularly on commercial vehicles, is interlocked with the controller. Yet another modification employs solenoid contractors of the railway type to operate the controller. This design, provided a very high degree of care be exercised in its installation, should have a considerable vogue in the future. It would be a distinct gain to be able to operate a 5-ton truck by push-button electrical control. Electric braking does not appear to find favor in American practice, though one English car, the well-known Electromobile, uses such a brake for emergency service. If designed so as to retard the car gently—that is, not to skid the driving wheels—there is much to be said in favor of electric braking, as it is less severe in its action and wears nothing out. A useful refinement to a controller consists in arranging that an electric bell shall ring if the current be left on when the brake is also in the on position. This is more necessary than may appear at sight, as it is quite easy for a careless driver to leave his controller in the first notch (generally insufficient to move the car with the brake on), thus wasting much energy and perhaps doing great damage.

Charging plugs were the occasion of much confusion and waste to time in the earlier days of the American industry. This matter should, in the opinion of the authors, be discussed in England as early as possible by those interested. Much trouble afterwards would be saved by the adoption of a soundly designed plug right from the beginning of the movement. The electric automobile, whether pleasure car or commercial, presents some special problems of its own on the score of lighting equipment. The usual arrangement consists in taking leads from a few cells of the power battery, relying on the gradual voltage drop not proving great enough to dim the lights seriously. In American practice some difficulty is occasioned by the lack of standardization in bulb sockets; this difficulty would be much smaller in England, however. A voltage of six metal-filament lamps gives a good range of candle-powers in stock bulbs, and such lamps are very cheap. It is a good plan to put the rear lamp in series with a small colored bulb illuminating the amphere-hour meter on the dashboard.

Reference should be made here to the use of the ampere-hour meter. This device has attained much perfection and convenience of form at the hands of the Sangamo Electric Company. Such an instrument replaces the amperemeter and voltmeter if used discriminatingly, at the same time affording a more accurate index of the battery performance. In one type, the best in the author's opinion, there is a differentially shunted circuit which ensures that ampere-hour readings shall be a true measure of battery output, and shall measure effective battery in-put, that is allowing for battery efficiency. Thus 85 amperes for one hour would register an output of 85, but to register an input of 75 ampere-hours would probably require 100 ampere-hours. If the instrument be set to allow for necessary battery inefficiency, it may then be used practically as a reversible energy meter. This applies especially to the Edison battery, in which it happens that ampere-hour output is hardly affected by rate of discharge. This ampere meter is a damped mercury motor, of which the speed is nearly proportional to the value of the current passing.

The pioneer electrics were as lacking in detail perfection as they have since become refined and advanced. For some not very obvious reason these machines were made disproportionately heavy, and in the case of pleasure cars were equipped with bodies, the great ugliness of which has created a widespread impression that the electric must necessarily be ungainly and archaic in appearance. Although great advances have been made in the attainment of a pleasing appearance in the case of pleasure cars, there yet remains something to be done on the score of proportioning the weight of the car accurately to the demands likely to be made on it. As already mentioned, there is something more than differences of opinion involved when two cars designed for the same duty differ in weight by over a ton. Being essentially a moderate-speed machine, it should be possible to make the electric slightly lighter than its petrol competitor for many services, particularly in the case of the heavy type of passenger machine, including 'buses, char-à-bancs and the like. The somewhat heavy design adopted by American manufacturers may probably be due to the bad roads which are met with even in many of the more important cities of the United States. It is likely, therefore, that the excellent roads of the United Kingdom may permit of a considerable lighter type of machine coming into general use here, an advantage being thereby gained in mileage. As is natural, the design of American commercial electrics has followed in its main features closely on the lines laid down by the petrol car. Frames are usually of pressed steel channel form, stiffened by cross bracing and gusset plates, the lightest being built up from stock sections. A sub-frame is used to suspend the battery case and also for the motor when this is geared by silent chain to a countershaft. While there is some diversity of practice in both battery location—this applies more particularly to pleasure cars—and to the method of mounting the motor, there is a general unanimity of practice in choosing chain drive as the final transmission for commercial cars. The live axle is but rarely used on commercial electrics, though a tendency is observable in that direction in the latest models.

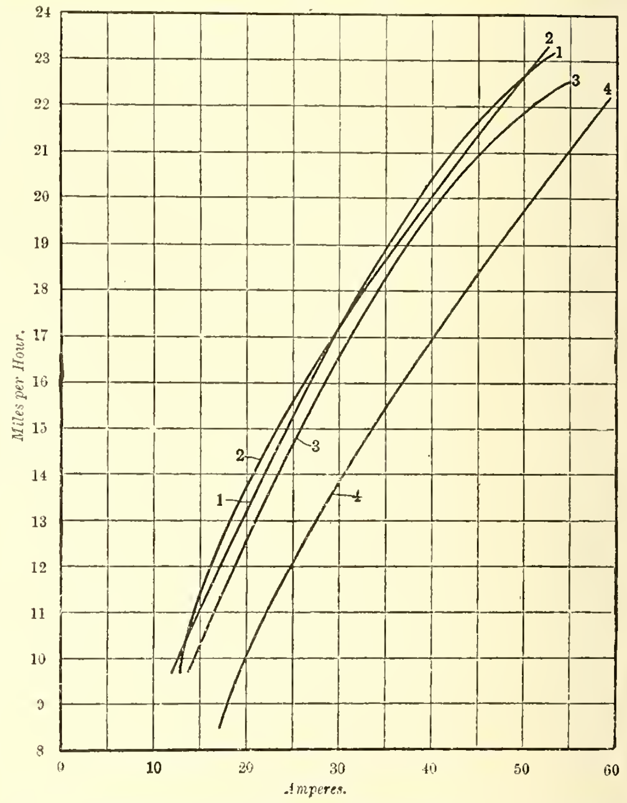


Fig. 4—Showing the Relative Power Consumption on an Electric Car with Various Makes of Tire.

(3)—M. & W. 34x4 in. (50 lb.) (1)—Motz Cushion 36x4 in.
(4)—M. & W. 34x4 in. Dunlop Gas. (2)—M. & W. 34x4 in. (70 lb.)

The most usual position for the battery is amidships and longitudinal, thus permitting of easy access for examination when necessary. In one or two cases the battery is mounted in two trays, one on each side of the chassis, which can be pulled out sideways on castors, the side lid of the battery box serving, when hinged down, as a horizontal platform for this purpose. It is not usual to make provision for unshipping the battery in place of a "freshly charged" renewal. Practice favors rather the method of giving a vehicle a battery adequate to deal with an average day's work. Springs have received much careful attention, and are usually provided with well-lubricated shackle bolts having stuffer grease cups to maintain that desirable condition. American designs of steering gear would not strike the British engineer as being sufficiently robust, nor does much attention appear to be given to the possibility of taking up wear on the reduction gear thereof. Irreversible steering, especially on a heavy chassis, entails an unpleasant backlash on the steering wheel unless the steering gear be in very good adjustment. Another feature of American design lies in the frequent practice of arranging the steering connections in front of the axle. It is not a vital point, though where possible—and these cases are a majority—it would seem better to place the cross rod out of reach of accidental bumps. Exception might also be taken to the inadequate and inaccessible arrangements made for applying an oil can or filling grease cups on some cars. The ball-snap lubricating terminal may be cheap, but it is certainly very inconvenient, especially when situated in some place where the oil can spout can approach it only horizontally. Mud guards are another improvable detail; these do not encircle the wheels enough, nor sometimes is the front guard provided with an extension flap, the absence of which entails splashing of body work and an absence of the smart appearance associated always with the electric.

The tire problem is one that has not been studied as carefully as it warrants by engineers. Speaking generally, it is assumed that if a wheel be shod with a tire sufficiently large in cross-section to carry its load, while possessing also a good degree of resiliency, then, granting durability and freedom from road trouble, no other consideration need be involved. Perhaps such a view of the condition is warranted when specifying tires for a heavy petrol machine, as the large excess of power over average requirements available renders any loss of wheel to road efficiency unnoticeable, excepting in the fact that some tires may get unduly hot. With the electric the tire question is a very important one, even more important in many instances than, say, the choice between chain and gear transmission. For heavy machines the chief consideration appears to be not to equip with tires that are very soft. A medium hard tire gives noticeable better mileage, due partly, no doubt, to the lessened internal work performed on the tire. This loss is evidently a function of the depression of the loaded tire as compared with the same tire unloaded. The exact relation between resiliency, speed, load and internal loss are apparently not at present known; though differences in mileage of as much as 50 per cent are stated to have been measured on the same vehicle by changing over from one make of tire to another, all other conditions remaining unaltered. Pneumatic tires afford the same type of comparison, similar to the now well-known differences existing between the so-called "cord" tire and tires of the canvas type. Carefully made experiments in England have proved that one make of tire absorbs 100 units of energy, while another, under the same conditions, fritters away 180 units. It will not be surprising, therefore, to learn that some recent experiments on an electric car proved that the ordinary type of pneumatic tire absorbed 25 per cent more power from the battery than the standard make of "special electric" tires. The curve showing these results is reproduced (Fig. 4); the trials were made this year. Unfortunately, there appears to be as yet very little information available on this interesting subject. Evidently it is worth studying, however. The special tires referred to are the light walled tires having a moderately thin resilient tread. Such tires would, of course, be useless on a high-powered petrol car. For very heavy electric trucks special tires composed of a series of wood blocks arranged close to each other around the rim have been tried, apparently with satisfying results where the roads are moderately unindented. Another experimental tire for the same purpose was composed of a chain of short lengths of steel wire cable encircling the wheel. The ends of the short pieces of cable were electrically welded, thus preventing any tendency to fray. Several designs of spring wheels that have proved unsuccessful for the high speed for which they were intended originally may prove eventually useful to the electric. Inventions sometimes progress in such a way. A few remarks on the subject of wheels are appropriate at this point. When machines are fitted with small wheels the power consumption may mount up considerably beyond what is necessary. The size of a wheel may affect the total tractive effort in two ways: (1) By reducing the tractive effort per ton in a manner inversely proportional to the square root of the diameter; and (2) by increasing or reducing the tractive effort proportionately to the added weight increment of the larger or smaller wheel. This latter effect is very small, however, in practice, and may be ignored. The diametrical effect, however, is not so negligible. The difference in road resistance between wheels respectively of 30 inches and 40 inches is 14 per cent—quite a useful figure on a battery car. Practical considerations, including cost, must naturally limit the size of wheels permissible.

Throughout this paper attention has been confined mainly to the commercial machine, not because the passenger electric is unimportant—indeed, the very contrary is true—but because the future of the industry and the greatest results hanging on that future appear to be invested in the commercial machine. To the majority of owners of private automobiles the fascination of sheer mileage, coupled with speeds that are often dangerous, outweigh most other considerations. Another class exists, however, which would welcome the reliable, noiseless, clean stateliness of the electric automobile. This class is well worth while looking after, and will prove itself to contain a large enough number of professional men, ladies and erstwhile owners of horses who have never yet taken to the petrol machine to keep quite a few high-grade pleasure electric concerns busy right from the beginning of their activities. The pleasure electric constitutes the cheapest method of quick transport that we have at our disposal. For example, a car will average a 60-mile journey on an energy consumption of 24 units battery input, equal to 0.4 unit per car-mile for a four-passenger car. In the opinion of the authors there is a very wide field indeed for the pleasure electric on account of (1) great reliability; (2) perfect simplicity, silence and absence of odors; (3) absence of "stand-by" losses; (4) unrivalled comfort and cheapness of operation.

It is, of course, not true that an electric will save money if run merely as a substitute for a fully employed existing horse service. By this statement is meant that if, on a one-horse route averaging 15 miles per day, an electric were substituted for the one-horse van, then conditions would be inferior, as cost per ton-mile must have gone up. Therefore, when inaugurating an electric system of transport, it must be remembered that the power machine must be working at a reasonably good load factor, so as to distribute the inevitably higher charges per vehicle day. The obvious way to achieve this is (1) either to do more work—*i. e.,* expand the operations of the business—or (2) use less vehicles over a greater mileage per day. Much misconception and useless argument is likely to arise unless this fundamental aspect of running cost be kept always in mind.

Truck Development in St. Louis

Following the opening recently in St. Louis of the first garage for electric trucks, manufacturers of such vehicles are planning to develop their electric truck selling machinery in St. Louis. At present ninety-five electric trucks are in use in St. Louis, and of these fifty are operated by the Anheuser-Busch Brewing Association and twenty-three by the Union Electric Light and Power Company, both of which have maintained their own separate garages. The new electric truck garage is at the northwest corner of Nineteenth and Chestnut streets, covering a space 180 by 109 feet. T. B. Entz is its manager.

B. R. Tewksbury, field engineer of the Baker Electric Company of Cleveland, Ohio, is in St. Louis in conference with the Park Automobile Company, distributers of the Baker electric trucks, with a view to developing the field.

"St. Louis is far behind in the electric truck business as compared with many smaller cities," said Mr. Tewksbury. "The cause of this backwardness is solely the previous lack of a garage for electric trucks, which made it impossible for truck users to obtain service. The delivery business, with short hauls and many stops, is distinctively in the domain of the electric truck, and St. Louis offers an exceptional field. It has good streets, cheap electric power, and no prohibitive grades. The Baker Company has just placed a fleet of four trucks with the Board of Education, and we are arranging to bring in a corps of demonstrators and a complete line of trucks for display. At present the electric truck field is filled partially, and not entirely satisfactorily by gas trucks, which are at their best in another field."

The Kentucky Wagon Company of Louisville, Ky., makers of the Urban electric truck, have sent C. Y. Ray to establish an agency, with a view to developing the field.

The electric trucks now in use in St. Louis are as follows:

Woodward & Tiernan Printing Company, 1; Simmons Hardware Company, 1; Krey Packing Company, 4; Famous & Barr Company, 2 buses; St. Louis Independent Packing Company, 2; Independent Breweries Company, 1; Anheuser-Busch Brewing Association, 50; Union Electric Light and Power Company, 23; Scruggs, Vandervoort & Barney, 2; American Express Company, 2; Hanley-Kinsella Coffee and Spice Company, 4; Marx & Jones, 1; Western Screen and Door Company, 1; Armour & Co., 1.

The Union Electric Light and Power Comapny has placed an order with the General Vehicle Company for twelve additional electric trucks. The electric truck companies at present represented in St. Louis are General Vehicle Company of Long Island City; the General Motors Truck Company, Pontiac, Mich.; the Baker Electric Company, Cleveland, Ohio; the Waverly of Indianapolis, Ind., and Walker of Chicago.

Rauch & Lang Enlarging Factory

When the Rauch & Lang Carriage Company, of Cleveland, completes the construction of its new four-story addition to its immense factory it will have what is claimed to be the largest plant for the exclusive manufacturing of the electric vehicle in the world.

Ground will be broken immediately for this new building, which will be of brick and concrete. It will be unusually fitted with light facilities, and its architectural style will harmonize with the general plan of the large buildings now standing. A sprinkling system, to be installed throughout the entire structure, will be an interesting feature of the new building, which will measure 199 feet by 112 feet, and will mean an additional floor space of 78,000 square feet. The rapid development of the Rauch & Lang Carriage Company unquestionably shows that the sphere of the electrically-propelled vehicle is becoming bigger and bigger every day.

Electrics Easily Cared For

"The electric car is becoming more popular every day and the rapidly increasing demand for these convenient and luxurious vehicles is taxing the capacity of almost all the leading manufacturers of electric pleasure cars," says J. A. Kellam of Toledo, Ohio, now in Denver.

"A great many people imagine an electric car is a very complicated piece of machinery, which belief is surprising in view of its extreme simplicity. Since the battery is the source from which is obtained power to operate and light your car, its care and attention is a thing that should never be neglected, but a very little study will make this easy.

"There are two mistakes that are frequently made that tend to weaken the efficiency of the battery, undercharging and overcharging.

"Care must be taken fully to charge the battery, but do not overcharge. A direct indication of excessive overcharge is a very notable increase in the temperature of the cells and a giving off of gas. The temperature of a battery must not be allowed to exceed 110 degrees F., the cells near the middle of the battery being used as a guide.

"While charging the battery open the compartment to obtain as much ventilation as possible. The lamps on the car should be turned off, as they are liable to be burned out by the increased voltage if they are lighted while charging.

"A part of the equipment necessary in taking proper care of a battery is a specific gravity tester or hydrometer and a good thermometer. It is not economy to charge the battery more frequently than once a week unless the service requires it, but a battery should never be left standing completely discharged.

"Once each month, after the battery has received its regular charge, give it an overcharge of not less than three hours at one-half the regular finishing rate.

"When a battery is to remain idle for a period of not to exceed four months see that it is in good condition and give it an overcharge immediately before and after the idle period; if more than four months, send it to your battery man."

Truck Activities in Montreal

A. Jennings & Company, of Montreal, have become agents for the Atlantic electric wagons and trucks manufactured by the Atlantic Vehicle Company. Electric wagons and trucks have passed the experimental stages of their use in Montreal and since their inception there, less than three years ago, have constantly and steadily gained the approval and favor of the different mercantile establishments. Montreal and subsidiary territory show promise of becoming a most profitable field for the electric vehicle.

How Central Stations Can Increase the Load

Paper Read at the New England Electric Vehicle Convention

BY W. C. ANDERSON

The Boston Edison Company has aided the development of the electric vehicle industry by the establishment of an exclusive garage, by a reduction in power rates for battery charging, by the purchase of fifty-six electric cars for its own use, and by general publicity work. Even in the smaller cities where the promotion of the industry will be on a smaller scale, the central station manager should use his best influence to see that a responsible dealer represents a line of electric cars of some standard make. If such a dealer cannot be easily located, the power company itself should handle the proposition until a representative of the proper caliber is found. After the selling of a car which is to be kept in a private garage, the central station should give its part of the installation immediate attention. The establishment of a low rate for battery charging for both public and private garages will greatly assist the dealer in marketing his cars. Many New England stations have already assisted the introduction of the electric along these and other lines, such as the battery exchange system recently established at Hartford. Cooperation with vehicle manufacturer is the solution of the central station's "off-peak" problem.

I SHOULD indeed be ungrateful if I did not avail myself at this time of the opportunity to publicly express my appreciation as well as that of my associates, at the splendid publicity work which has been done, and general co-operation extended by the Boston Edison Company in promoting the electric vehicle industry. Its management has been broadminded enough to see that the advent of the electric vehicle in large quantities in this city would effectively solve one of the most vexing problems which the central station has to meet, namely, a constant demand for its off-peak load.

In the city of Boston an exclusive electric garage, which I understand is of the highest quality, is now being operated by the Boston Edison Company. This garage is fast assuming the characteristics of the ideal station, and will undoubtedly serve as a model to be followed by other central stations who will soon fall in line with this "help each other" progressive movement so general throughout our land.

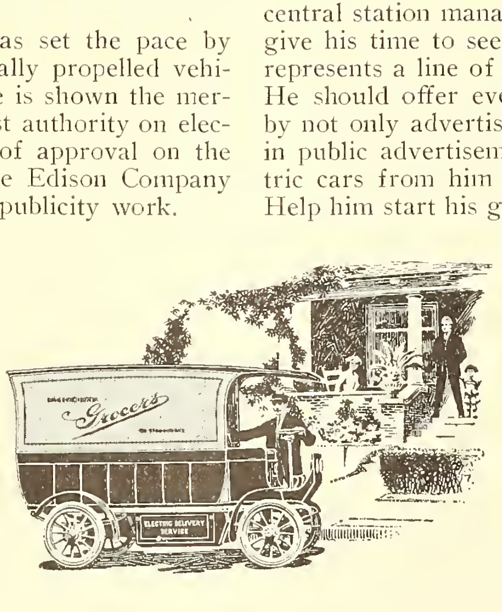
Since October 1, 1912, the power rates for charging electric vehicles in Boston have been reduced more than fifty per cent. Prior to the date mentioned, the consumer of current for battery charging paid $10.00 for 100 kws. Now he may secure the same amount for about $4.00. The benefits of this reduction in power rates has already been felt by the Edison Company in the large increase in power consumption which has followed. The electric vehicle industry has also been greatly benefited.

The Boston Edison Company has set the pace by purchasing and operating 56 electrically propelled vehicles. By this move, material evidence is shown the merchants of the city that those of highest authority on electrical matters have put their stamp of approval on the modern electric vehicle. Further, the Edison Company has appropriated generous sums for publicity work.

Such actions as outlined are in strong contrast with the policy being followed by some of the nonprogressive central stations, who are still living in the dark ages, quite content to operate their business today along the same lines followed by their great grandfathers. There are too many central stations in the East whose management does not realize that there is a larger profit to them in the electric car than there is in the old horse-drawn equipment or gasoline cars. There are localities within fifty miles of Boston that are charging 25 cents per kwt. for electric charging current. We receive many inquiries and personal calls at our Boston branch by those seeking information as to the cost of charging electric cars in certain localities, and upon learning the prohibitive rate they would have to pay, they determine to postpone the purchase of their electric car, and thus the sale is lost; resulting not only in loss to the electric vehicle manufacturer, but also to the power station itself. Do you suppose that in such localities electric cars will ever be used to any extent or buyers interested in them under the present circumstances? There may be a few who care nothing for expenses who will invest, but the buying will never be general there until the central station does exactly what the Boston Edison Company has done, and what the New York and Chicago Edison Companies are doing.

I cannot refrain from here mentioning the splendid work which has been started in New York by Mr. Williams, the man who has rolled up his sleeves and started a co-operative campaign in promotion of the electric vehicle which is most commendable, and within the next few years will surely result to the benefit of his company's bank account.

In smaller cities the promotion of the electric vehicle industry by the central station will, of course, be on a smaller scale than in the larger cities. However, their central station manager should use his best influence and give his time to see that a responsible dealer in his city represents a line of electric cars of some standard make. He should offer every encouragement to such a dealer by not only advertising the merits of the electric vehicle in public advertisements, but also should purchase electric cars from him for the central power station work. Help him start his garage right by giving him the service of your engineers, and last but not least, give him free power for several months until he gets his work built up to a paying basis. In my opinion, the establishment of a responsible dealer who is capable and has the proper facilities for handling the electric vehicle business, is the first step toward success. If such a dealer cannot be easily located in your city, you should take hold of the proposition yourself until an excellent repre-



sentative of the proper force and caliber can be found.

We are constantly selling electric cars to owners of gasoline automobiles such as the Packard, Pierce-Arrow, Locomobile, etc. In such cases the owner usually has his own garage, and will therefore require the installation of a rectifier or motor generator set with which his batteries may be charged. When such a case arises, would it not be a wise move on the part of the central station to give part of the installation immediate attention, instead of dallying along several weeks, during which time the new electric car owner becomes disgusted with the entire proposition? The rate charged for current in private garages should be as low as is consistent with local conditions. When the lady owner of an electric car tells her friend whom she may meet at an afternoon tea that her electric car current bill last month, which drove her car in the vicinity of 600 miles, was less than $10.00, you may be sure the friend resolves to make a strong point of this fact when she next discusses the matter with the master of the house.

Some of you may consider it impossible to operate an electric car so cheaply. I hold in my hand power bills for operating my two electric cars in Detroit which during the past two months, cost respectively five and seven dollars. The Detroit Edison Company is thriving under these conditions. Its stock is away above par and indications are that it is going much higher.

That there is a just reason for the intensified efforts of the central station manager to promote the use of electric vehicles in his territory, is most ably and conservatively outlined by H. W. Hillman in his paper read before the Electric Vehicle Association of America on the evening of January 21, 1913. Mr. Hillman closes his paper with a statement based on Mr. Edison's prophecy that "with the proper efforts extended by the central stations throughout the country, an increased income to those companies will be realized amounting to four hundred and eighty millions of dollars within the next fifteen years."

Aside from the promotion work being done in Boston and New York, much credit is due to other central stations in New England, such as the Northampton Electrict Light & Power Company, Northampton, Mass.; Greenfield Electric Light & Power Company, Greenfield, Mass.; Middletown Gas & Electric Company, Middletown, Conn.; United Electric Company, Bridgeport, Conn.; United Illuminating Company and Union Gas & Electric Company, all of New Haven, Conn.; Norwich Gas & Electric Company, Norwich, Conn.; Edison Electric Illuminating Company, Brockton, Mass.; New Bedford Gas & Edison Light Company, New Bedford, Mass.; Lowell Electric Light Company, Lowell, Mass.; Holyoke Gas & Electric Company, Holyoke, Mass.; United Gas & Electric Company, Springfield, Mass.; Worcester Electric Light & Power Company, Worcester, Mass., and many others, who have purchased electric cars for their company's use and in other ways promoted the industry in general.

At Hartford, Conn., the Hartford Electric Company maintains a battery department where owners of electric vehicles may rent batteries at a fixed cost per mile or per year, as may be required. This policy relieves the vehicle owner from investing his money in battery equipment, also of the fear so many purchasers seem to have that a storage battery is a difficult and expensive affair to maintain. This policy has resulted in largely increasing the electric vehicles in Hartford, which has naturally resulted in great benefit to all concerned. It would be well worth your time to appoint a representative to visit this Hartford station, to investigate this particular action.

In every city large enough to support a central power station there are great opportunities for electrically propelled vehicles. If the fabric mills in this territory are not all put out of business because of recent tariff legislation they will still have to transport their raw and finished material to and from depots or boats, as well as cart them about their plant. This work is now being largely done in the former case by horses and in the latter by hand trucks, pushed by laborers. Every effort should be extended by the central station in those localities to see to it that these horses be replaced by electric vehicles, and that the hand trucks be discarded for the electric industrial trucks, which are being successfully operated today by the Pennsylvania Railroad Company, Central of Georgia Railroad Company, Canadian Pacific Railroad Company, Central Railroad of New Jersey, Federal Sugar Refining Company, Westinghouse Electric Manufacturing Company, Hendy Machine Company, Lehigh Valley Railroad Company, Illinois Central Railroad Company, Louisville & Nashville Railroad Company, Old Dominion Steamship Company, Pittsburgh Steel Company, North, Judd & Company, Goodyear Tire & Rubber Company, Diamond Crystal Salt Company, Champion Internation Company, American Manufacturing Company, Detroit Copper & Brass Company, Windsor Machine Company, the Pullman Company, Packard Motor Company, Defiance Machine Company.

Within the very near future, if every central power station througout the country will put its shoulder to the wheel and push the electric vehicle industry with a force relative to its merit, the problem of "what shall we do with our off-peak production" will be a matter of minor consideration to the central station.

St. Louis Education Board Buys Trucks

The four Baker electric trucks recently bought by the St. Louis Mo., Board of Education are in service. The fleet includes a two-ton, costing $3,200, and three one-ton trucks, costing $2,900 each. The machines produced by the Baker Motor Vehicle Company of Cleveland, were sold by the Park Automobile Company, local distributers, through John W. Hansard, head of the company's electric department.

The trucks were unloaded in East St. Louis and brought to St. Louis on their own wheels, attracting much attention as they came through the downtown district. The cars stopped a short time in front of the Goodyear Rubber Company's local branch, to display them to J. A. Moroney, manager of the branch, who had provided the tires for them.

The trucks were accepted by A. M. Brown, supply commissioner of the Board of Education. They replace seven two-horse vehicles and will be used in delivery service between the office of the supply commissioner and the public schools, one of the trucks being designed expressly for service to the Educational Museum, at Grand and Theresa avenues. The trucks will be housed in a garage being erected by the Board of Education on School street just east of Grand avenue, and will be charged from the power plant of the Central High School, a short distance west and north. The trucks will run 50 miles on one charge. All the trucks are equipped with Ironclad batteries.

Wire Wheels and Some of Their Characteristics

Describing One of the Latest Tendencies in Pleasure Car Design

BY JOHN B. RATHBUN

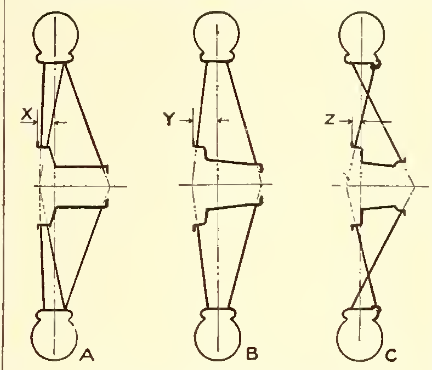


Fig. 1. Longitudinal sections through three of the principal types of wire wheels. A.—Triple Spoke Construction. B.—Double Spoke Construction. C.—Crossed Spoke Construction.

IN THE early days of automobile construction when the speeds rarely exceeded twenty miles per hour, the makers adopted nearly every detail of the bicycle that could possibly be applied, and among these items was the familiar tangent spoked wire wheel of the bicycle, slightly strengthened but the same in principle. With increasing speeds and vehicle weights, the old type of wheel fell into disfavor because of its inability to withstand the racket, and a modification of the wooden carriage wheel soon made its appearance, a type that is in almost exclusive use in this country even today.

While the wire wheel in its new form has been used with great success in Europe during the past few years on both racing and pleasure cars, the makers and motoring public of the United States have been slow to avail themselves of its undoubted advantages, probably because of the memory of the old buckled bicycle type that gave so much trouble in the old days. It is only during the past year that the wire wheel has been noticed in the streets of our cities in numbers sufficient to cause interest, and these principally on gas cars of foreign manufacture.

The high tensile strength of the steel used for the wire spokes as against wooden spokes made the light weight racing bicycle possible, and for the same reason has a great future in the automobile industry where tire wear is the most important and expensive item in the upkeep of the machine. The savings in power loss and tire wear through the use of wire wheels are due to several factors, of which weight, resiliency, heat radiating capacity, impact, and fly wheel effect are the most prominent, providing, of course, that the wheels are of the same strength. In regard to strength, especially strength in an axial direction required to resist skidding, the centrifugal forces encountered in turning corners, and the side strains occasioned by striking curbs, etc., it has been found by actual test that the wire wheels can be built much stronger than any existing form of wood wheel without an excessive increase in the weight.

A heavy wheel acts much like a heavy hammer in pounding the tires on rough roads, for every projection or bump in the roads act against the inertia of the wheel, compressing the tire, and increases the tendency to rim cut with even a fully inflated tire. This strain is reduced to a minimum by the light wire wheel since the rim is very light compared with the heavy wooden felloe and demountable rim of the wooden wheel. The detachable wire wheel weighs but little more than the demountable rim.

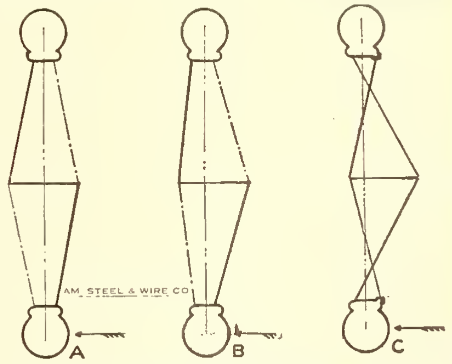


Fig. 2. Diagram showing the nature of the stresses in three wheels when side thrust is applied to the rim. The heavy lines denote tension and the dotted lines compression or relaxed tension when the wheels are strung with a heavier initial tension than the compressive stress.

Since the wire wheel rim is suspended from the hub at 70 points or more in its circumference by as many fairly flexible spokes there is but little of the impact experienced in the wood wheels when a stiff and rigid spoke comes directly over the point of contact between the wheel and the road bed. These rigid spots prevent any absorption of shock in the wheel proper and transmit the inertia of the entire car to the tire, the direct cause of the frequent blowouts. This effect is increased by the added rigidity of the demountable rim used on the wooden wheel. Since the wire wheel spokes are in tension, and for the reason that the load is suspended from a great number of points, the load is distributed around the rim more uniformly than in the case of the solid spokes that are in compression and that transmit the load from the axle direct to the road. Due to this uniform loading and to the slight flexibility of the wire spokes the wheels do not tend to bounce over road obstructions in the same degree as a more rigid wheel and hence have easier riding qualities.

All tires slip on the road surface to a certain degree, causing heat through the motion and friction of the two surfaces. The harder the driving and the greater the speed, the greater will be the slipping and heat regardless of the class of wheel. The immediate effect of the heat thus generated is to devulcanize the rubber and cause a blowout unless the heat is radiated by the wheel as rapidly as it is produced by the slipping. The heat radiating qualities of the steel rim and wire spokes is immeasurably greater than that of a wooden wheel with its thick rim and almost non-conducting spokes, and as a result the tires remain cooler on a wire wheel than on a wood, even in hot weather.

In England a six months' test made with wood and wire wheels under exactly the same conditions demonstrated that the tires on a wire wheel gave 68.75 per cent more service than the same tires mounted on wooden wheels. When any innovation produces this degree of saving on the most expensive and troublesome item on a car without adding more troubles of it own it is evident that it has an enormous future in the industry. In addition to the saving shown by the tests on the English taxicabs

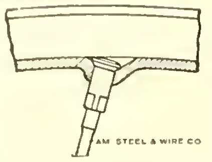


Fig. 3. Typical nipple showing the manner of attachment to the rim and spoke.

just cited, the effects of the wire wheel have been amply demonstrated in the various automobiles, both in this country and abroad, few of the racing vehicles equipped with this type of tire suffering from tire trouble while in the contest.

A feature of the wire wheel that should commend it to the electric vehicle user is its efficiency as a power transmitting device in delivering a greater percentage of the power for propulsion. Having but a small "fly-wheel" effect due to its low weight it retards the acceleration or starting of the car to a minor degree and therefore draws less than the usual amount of current in starting the car. Due to the resiliency of the metal employed in its construction and to its elasticity the wheel is livelier and consumes less power when in transit. With the same amount of current the car gets away quicker since it does not have to overcome the inertia of a heavy rim.

In the mud the wire wheel again proves its superiority as it does not have the same tendency to clog as the spoked wheel, and hence is not so likely to stick in a heavy road. The small diameter of the wires effectually prevents any mud from sticking on to them after the wheels start to rotate.

CONSTRUCTION OF THE WIRE WHEEL.

Possibly the first wire wheel to be used for vehicle purposes was the old radial spoke type used on the high wheel bicycles in which the spokes ran in radial lines from the hub to the rim. This manner of "lacing" or placing the spokes was suitable for supporting a vertical load but was not well adapted for receiving the twisting due to the propulsion of the wheel nor for resisting end thrust. The turning effort of the rider on the pedals had tendency to bend the spokes instead of causing them to hang in tension which of course increased the strain tremendously over that due to the simple support of the weight.

The failure of the radial spoke wheel led to considerable experimenting until the tangent system was finally discovered, a wheel that is used exclusively on the bicycle and motorcycle of today. In the tangent spoke wheel the spokes do not run toward the center of the hub, but as the name implies run tangent to the hub, so that any turning force that may be applied to the hub will place them in tension instead of producing a bending moment in the spokes. As every other spoke lies on the opposite side of the hub there is no tendency to twist the hub when a load is placed on the wheel, since the two spokes pull in directions opposing each other.

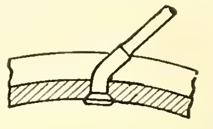


Fig. 4. Showing the upset head of the spoke and the method of fastening to the hub.

The spokes of the tangent wheel are arranged in sets of two spokes each, one spoke on one side of the hub and one on the other. The pairs from the back of the hub interlace with those from the front in such a manner that the front and back spokes alternate in position on the rim of the wheel. When the hub is turned toward the left the left hand spokes of each pair are placed in tension while those on the right are relieved or placed in compression if the initial tension that is placed on the spoke is less than the compression due to the load. To prevent compressive stress from being placed in the spokes it is therefore necessary to strain the spokes tighter, when making the wheel, than any compressive stress that can occur.

In both the radial and tangent wheels, the spokes that lie above the horizontal center line are always in tension if subjected to no other stress than that due to the vertical dead load. The tensile stress in the spokes that are near the horizontal center line is due to the tendency of the upper spokes to flatten out the rim, the horizontal spokes acting as restrainers in keeping the rim to its circular form.

While the tangent spokes were a great success on the bicycle or other light vehicles where there was but little side thrust or torsion, they were not able to combat the high degree of torsion, high speeds and heavy weights met with in automobile practice. This failure in automobile service was due principally to the hubs which were both too short and too small in diameter to resist the stresses incident to the new service when made in the same proportion as the bicycle wheels. The spread of the spokes in the old bicycle wheel was usually made about one-twelfth of the wheel diameter while the spread in the automobile hub should be at least one-fifth of the diameter, or over twice as long.

This "spread" or distance between the front and rear spokes measured on the hub is a vital point in resisting side thrust or skidding. The greater the included angle between the front and rear spokes, the stronger the wheel in the direction parallel to the axle. With the common type of tangent wheel the axle length would be excessive if the proper spread were given and it is principally for this reason that the triple spoke and crossed spoke constructions have recently come into use, as the same strength may be obtained with shorter hubs.

In Fig. 1 three typical sections are shown, taken through the axis of the wire automobile wheel as it is built today. Nearly all wire wheels are based on

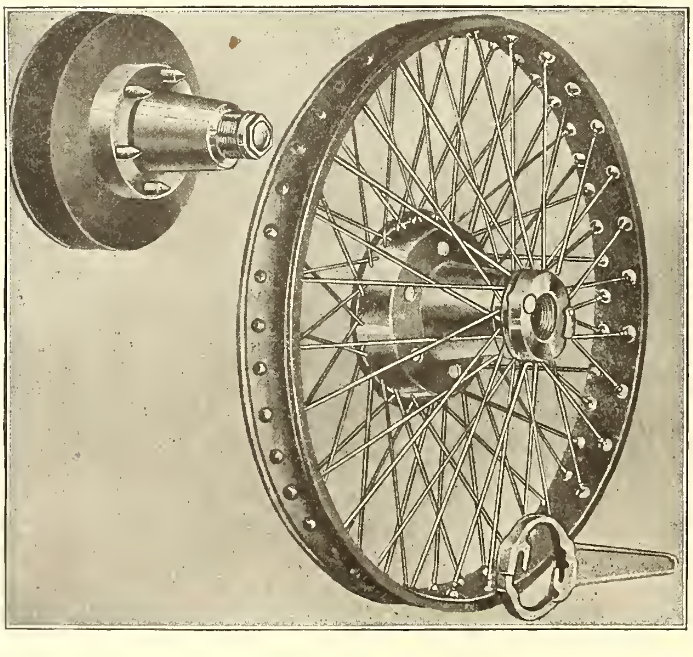


Fig. 5. Showing the McCue demountable wire wheel, a detail of the inner hub, the retaining cap and the special wrench used in fastening the cap. The taper pins shown on the inner hub detail enter the holes in the flange of the wheel. The brake drum is shown at the rear of the driving flange.

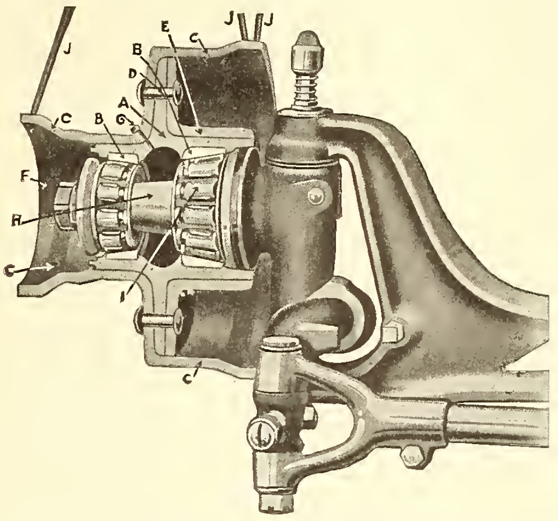


Fig. 6. Timken standard wood wheel axle after replacement with American substitution hub. The hub remains unaltered as are the roller bearings. C is the American substitution hub that is fitted in place of the wood spokes. The spoke bolts D, the inner plate E, and a new hub cap (not shown) are the only parts of the hub replaced.

one of these types the majority departing very slightly from the wheels illustrated. In Fig. 1, section *A*, is shown the triple spoke construction that has proven very popular and efficient. Two spokes from the enlarged portion of the hub are in nearly a direct perpendicular line; a slight cant of the spokes throws a certain percentage of the load into the third inclined spoke at the right. All of the spokes are tangent to the hub in the front elevation of the wheel. It will be noted that all three of the wheels are provided with a hub enlargement or bell at the inner end of the hub that allows a large tangent circle and therefore strengthens the wheel against the heavy driving or torsional stresses. It also covers the bolts used for securing the brake drums to the inner hub and in some cases acts as a driving flange on the demountable type of wire wheels.

In all three wheels the tire is offset from the center of the hub so that the load will be brought as close as possible to the steering knuckles to facilitate easy steering and to reduce the road strains on the steering column. The comparative amount of axial offset in the three cases is indicated by the letters *X*, *Y*, and *Z*. This offset is imperative in cases where the wire wheels are to be fitted on axles designed for wood wheels to avoid a change in the track or the position of the brake drums. The large diameter of the hub bell is often a great aid in adapting wire wheels to the hubs of old wooden wheels, since in many cases it is possible to place the hub so far back that it envelopes the steering knuckles of the front wheel and therefore brings the center of the tire nearly over the steering pivot.

By examining section *C* in Fig. 1, it will be seen that the front row of spokes shown at the right of the hub are very effective in resisting forces applied at the right of the wheel since the spoke has a considerable inclination in the direction of such a force. The left row of spokes are inclined to the right and therefore resist a force applied at the left of the wheel, although not to such an extent as the first row since their inclination is much less, but they are better adapted for the support of the vertical component of the load. It will be noted that the right hand spoke has a greater angle than any of the sections shown for a given length of hub and that with equal hub lengths, the latter type is stronger in resisting strain due to the skidding of the car.

Fig 2 shows how the strains are distributed in the wheels when a side load is applied to the rim. Section *A* shows a wheel that is central with the hub, section *B* an offset wheel with the same spoke arrangement, and section *C* shows a wheel with both offset and crossed spokes. When a force is applied to the rim of wheel *A*, the upper left hand spokes and the lower right hand spokes are placed in tension. The same distribution of strains occurs in wheel *B* but are quantitatively different, that is the elongation in the rear row is greater than in the front requiring more spokes in the rear than in the front when the tangent radii are equal. In the case of the wheel *C* in which crossed spokes are used, the flexibility of the rim increases the tension in all spokes when a side thrust is applied, instead of increasing the tension in the upper left and lower right spokes as in the case of wheels *A* and *B*.

The initial tension to which the spokes are tightened before being placed in service is one of the most important factors in the building of the wheel since the distribution of stresses within the wheel and the truth of its running depend entirely upon uniform tension in the spokes. Too little tension is worse than too much as the deflection of the spokes is greater with the low initial stress. This deflection with insufficient tension is due principally to an excess of the compressive stress over the tensile which, of course, results in the spokes bending and lowering the center of the hub in the wheel. When the spokes bend through the lowering of the hubs, their fastenings leave their seats once per revolution causing hammering and eventual breakage of either the spoke or its nipple, without initial tension the greatest stress comes into the horizontal spokes that prevent the rim from crushing out of round.

In building the wheel, uniform tension is applied to each spoke by the use of a special wrench that is designed so that the sockets slips past the handle after the desired tension has been obtained or exceeded. After the wrench has been adjusted to the required tension, the workman tightens each spoke in turn until the wrench slips. In several shops it is the practice to lace up the wheel, paying strict attention to the spoke stress, and after this has been accomplished to mount the wheel in a fixture that centers it perfectly and then bore out the hub. This insures an absolutely true wheel and is much less work than to true the rim exactly when tightening the spokes, a process followed in the old bicycle days.

With a single exception, the spokes are fastened into the rim by nipples that are very similar to the spoke nipples used on bicycles, except, of course, that they are much heavier. The head of the nipple is inserted in a countersink or depression in the rim as shown in Fig. 3. The nipple end of the spoke is enlarged or "swaged," as it is called, for the screw thread, this enlargement being made so that the diameter of the stock at the bottom of the thread will not be smaller than the body of the spoke, and therefore is equal or of greater strength than the body.

At the hub end of the spoke an integral head is formed on the spoke that corresponds to the head of a bolt, this being formed by an upsetting process. The spoke stock is enlarged for a short distance beyond the head to strengthen it at the bend and to compensate for the strained material caused by the upsetting process. The spokes are made of a special alloy steel that has a high tensile strength and whose composition enables it to withstand the vibration and shocks that it meets in practice. Since the spoke acts as a spring to a certain degree it must be able to withstand the stress reversals that produce crystallization.

DEMOUNTABLE WIRE WHEELS.

The demountable steel wheel accomplishes the same results as the demountable rim on a wood wheel, this feature permitting the driver to carry a fully inflated tire at all times in such a manner that it can be easily substituted for the defective tire without the delay incident to removing a heavy tire from the rim, making the patch and then inflating it when on the road. In the case of the demountable wire wheel the entire wheel, with few exceptions, is removed from the axle, a matter that is simpler than removing the demountable rim.

As the wire wheel is very light, only a trifle heavier than the demountable rim alone, the carrying of a wheel is no more difficult than the carrying of a rim. Little is gained and much is lost by providing the wire wheel with a demountable rim, for the extra rim greatly increases the weight of the wheel and therefore offsets one of the greatest advantages. An additional rim shortens the spokes and decreases the elasticity, and prevents the radiation of heat from the tire.

Different makers have slightly different methods of demounting the wheel. The general principle is practically the same in all, the variations occurring in the smaller details. The wheel is provided with a false hub that is forced back over the hub proper that contains the bearings and spindle. A lock nut is provided that fastens the wheel over the true hub and is also used in its removal in case of tire trouble. A special wrench is provided that unlocks the nut automatically when it is applied to the spanner holes. The wheel is driven by means of taper pins that project from an axle driven flange that inter the flange of the rear enlargement of the false hub.

The outer surface of the true hub and the inner surface of the false hub are machined to the same taper which insures a perfect centering of the wheel when it is replaced on the car, making road adjustments unnecessary. A removal and replacement can be made with any wire wheel in from thirty to sixty seconds by almost any driver of limited mechanical experience.

Owing to the fact that there will be a considerable demand for wire wheels by motorists whose cars are now equipped with wood wheels, the manufacturers have brought out a line of "substitution hubs" that are designed to fit the old cars. In nearly all cases the substitution hubs arranged so that they may be installed with out replacing the bearings or any of the expensive portions of the original hub, and the hub of the wire wheel fitted on with the wood still in place. In this case the same inner plate E is retained with both wheels.

(*To be concluded.*)

California Has New Electric

A new electric to be built in Los Angeles will be called the "Beardsley Electric," named after Volney S. Beardsley, president of the California Automobile Company, who has worked hard in gaining a foothold in the electric trade. As the success of this California-built electric car will depend largely on his efforts, the stockholders were unanimous in their vote that the car should be named the "Beardsley Electric."

Several weeks ago the California Automobile Company announced that it would give $100 for a name for the new electric car to be built and marketed by it, a name that would be of the greatest help in marketing a car in this territory. Great interest was manifested in the selection of this name, as is shown by a list of suggestions containing 469 names.

One man offered to buy one of the first cars built if his suggestion was adopted. However, his suggection was not selected.

"Many of the suggestions were typical of California, which are good, but the company hopes in time to extend its trade beyond this state, and, owing to a certain rivalry existing among some of the coast cities, it was deemed advisable to select the name of an individual," explained President Beardsley.

Mr. Beardsley has been identified with the automobile business in Los Angeles for nine years, and is one of the best known men in the trade. All of his early training in the East was in manufacturing, so that he will feel right at home around a factory.

John T. Shannon, electrical engineer for the company, together with several other electrical men, have been working for months in designing the electric car that is to be built, and great claims will be made for a long mileage electric. The company in the start will build one style chassis that will accommodate three types of bodies—roadster, victoria and coupe. They do not expect to build a cheap car, but one that will compare favorably with the best and highest priced cars on the market. Within a short time they will probably add to the line a light electric delivery car. There will be no "freak" ideas adopted, but they expect to use standard parts that have been thoroughly tested and tried and are now being used by the most successful builders of electric cars.

The West Seventh street salesroom and garage will be the headquarters of the company, where the cars will be sold and all makes of electric cars will be cared for. The factory will be located at the corner of San Fernando and Wilhardt streets, adjoining the Moreland Motor Truck Company.

Waverleys Take Part in Secret Time Contest

Members of the Manhattan Automobile Club recently competed in a secret time run to New Rochelle, given under the auspices of the club. Fifty-four cars were started in the run and fifty-three finished. All started from Columbus Circle. David Beecroft, referee of the contest, recently established time records for the run to New Rochelle, which is 17.5 miles from New York. One of the records was for a gasoline car and the other for an electric. The records were kept secret. The automobilists drove to see which cars in each class would come nearest to the time limit set.

In the electric class Mrs. Alice Waxham won with a Waverley car. She covered the distance in 1 hour, 24 minutes and 49 seconds. Beecroft's secret record was 1 hour, 20 minutes and 17 seconds. F. S. Rogers finished second in a Waverley. His time was 1 hour, 12 minutes and 36 seconds. Donald MacLean was third in the contest in a Baker.

Ground has been broken for the Phillips Electric garage at the rear of the Engstrom building in North Court street, Rockford. Ill. The work will be rushed that the structure may be finished before cold weather.

Advertising from the Manufacturers' Standpoint

Paper Read at the New England Electric Vehicle Convention

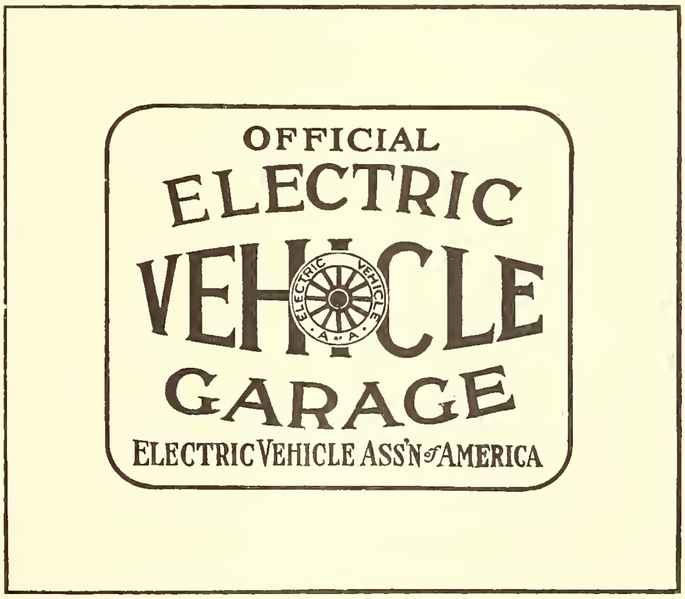
BY E. W. J. PROFFITT

The foresightedness of those interested in the electric vehicle has been exemplified by the publicity campaign of the Electric Vehicle Association. The spirit of coöperation manifested in this work is a large factor in the recent extraordinary development of the electric. It is suggested that the advertising of the association might now become more local in character. The use of newspapers in eastern localities would enable the central stations to coöperate because it is local in its application. Arrangements should be made with the central stations and vehicle manufacturers to supplement the advertising of the association along definite and predetermined lines. The most important essential is service. It is not advisable for the central station to advertise the electric extensively until such service shall have been provided. It is suggested that the central station is the logical agent to furnish such service. The manufacturer could allow the central station a certain sum for every vehicle sold in its territory, say from $50 to $100, to cover the expense of furnishing future service to that car.

THE title of this paper presents an opportunity to discuss the electric vehicle proposition from a different viewpoint — that of the third party to the triangle. Triangle? Yes, that eternal triangle, about which we read so much in love affairs and divorce cases, is to be found even in so prosaic and strictly utilitarian a business as that of selling electric vehicles; and the third party to this triangle (the other two being the buyer and the seller)—and Number Three man that "makes the crowd" and brings the crowd as well—the man that finds the buyer for the seller—and shows the buyer where's the seller—is the advertising man the man who presents your arguments to the public.

While the triangle may not be desirable in affairs of the heart, it is, however, regarded of considerable value in the vehicle business (witness the three point suspension feature for instance) and particularly in the development of a manufacturing business has it become a prime necessity, a prerequisite to success, almost a *sine qua non*—this triangle of seller, buyer and advertising man.

The world-wide, world-old problem of merchandising is distribution. In the olden days we used to make good goods and wait for the news of their goodness to create a demand, but now all this has been changed. Newer methods, newer economies have been evolved and the old ways are obsolete. Nowadays we make good goods and then wake up the people to the knowledge of their goodness by advertising.



Standard Official Electric Garage Sign Designed by the Electric Vehicle Association of America.

I do not mean to imply that the electric vehicle people have been somnolent in this matter of advertising. Far from it. A more active, aggressive, progressive body of men does not exist, and in the short life of this industry you have accomplished wonders. Your foresightedness and business acumen has been remarkably exemplified in the work of the Electric Vehicle Association of America, which through voluntary contributions has raised and expended over $50,000 in a few short months in advertising the electric vehicle; and the advertising has been well and ably done.

Many of your conventions, meetings of your various associations, I have attended—and it has been frequently an inspiration to me to recall the spirit of courtesy, co-operation and that only too uncommon appearance of earnest concentrated effort that has dominated your deliberations to the elimination of all that which was frivolous and time wasteful. That this spirit of efficiency should be manifested in the results of your labor is but natural; and, indeed, it is but fair to say the extraordinary development of the electric vehicle in the past few years is undoubtedly the fruits of such unusual efforts.

Handicapped by the inadequacy of the old type storage battery the electric vehicle made but little progress in the early days, but your intensive application to the solution of the problem, and the results accomplished, has changed all this, and we now have with which to work a machinery unit developed to a high state of efficiency—practical, economical and capable of carrying out its contract without the possibility of disturbance by those factors of uncertainty which surrounded the operation of the electric vehicle of the earlier days. With your product perfected, I believe you will solve satisfactorily the problem of distribution and service; and I include service because the very nature of your product makes service an essential feature of your selling policy.

And I ask when I take the liberty of suggesting to you certain thoughts which seem to be pertinent to these problems of distribution and service (which I shall do presently) to take into consideration, please, that they are offered to you from the point of view of the third party to that triangle of which I spoke, one who, being as close to the buyer as he is to the seller, has studied the needs of the first no less than the problems of the second. Consequently, my point of view being different than yours, I do not expect you to agree with all my conclusions, but please be as charitable as you can.

Embraced in that problem of distribution is, of course, the subject of advertising, and it is but natural in discussing advertising that I should refer to the publicity campaign of the Electric Vehicle Association. The central stations are greatly interested in the workings out of that campaign because they have contributed to it and are anxious to co-operate with it locally, which in almost every instance they have done, to a greater or less extent, depending upon the circumstances.

Gladys Caldwell, Prima Donna, and John L. Dickinson, Baritone, Sheehan Grand Opera Company, in Miss Caldwell's Waverley Electric.

The conclusions arrived at by the committee having charge of the campaign and their advertising counsel which prompted them to confine their entire appropriation to space in the general magazines and trade papers, at the same time eliminating the newspapers, may have been sound, and based upon a sufficiency of facts to warrant such a plan. Nevertheless it seems to me that they must have omitted to give sufficient weight to a certain fact which has been mentioned before by no less an authority than Stephen G. Thompson of the Public Service Corporation of New Jersey, who stated in his paper read before the convention of the Electric Vehicle Association in Boston last fall as follows: "Logically the future of the electric vehicle lies in the East, this being the section densest in population and hence of the most extensive street freight movement."

If Mr. Thompson's conclusions are correct, and I am inclined to agree with him, then the exclusive use of publications of widespread and national circulation would not be calculated to produce the greatest efficiency in results, however valuable these publications might be in the development of a proposition which was prepared for national advertising, which in my judgement, based upon ten years' experience in advertising (during five years of which I have been intimately associated with the electric vehicle proposition), is not the case in this instance.

On the other hand, the use of newspapers of prominence and prestige in those localities susceptible to great development as mentioned by Mr. Thompson, would have been more productive of results and at the same time such advertising would have enabled the central stations to co-operate with the newspaper work because as it is local in its application, it would permit of such connections.

The electric vehicle manufacturer has, in the past, I believe, likewise failed to take advantage of the result producing capabilities of the daily newspaper, while, on the other hand, the gasoline car manufacturers are aggressively utilizing this prolific producer of business, and through this medium, in spite of their handicaps, they have secured practically undisputed possession of the field; but one electric vehicle manufacturer (with all due respect to the others, who may have been more successful elsewhere) having made any impression whatever upon this New England field.

However, the technical reasons surrounding the question of mediums of local circulation versus those of national circulation are hardly of much interest to you and would be a better subject for discussion before an advertising men's convention than here. Therefore, I shall not trespass on your time by entering upon that subject.

Among the comments expressed by the contributors to the Electric Vehicle Association fund in respect to this campaign, I noticed one wherein the writer suggested that the vehicle manufacturers should turn their advertising appropriations over to the association and have the matter handled through that one organization. This plan, which does not appear to me to be either feasible or desirable, nevertheless suggests another which I submit should prove quite effective. This suggestion is based upon the assumption that your association will continue this advertising campaign for some time to come, which course I believe to be extremely desirable and necessary if you are to obtain value from that which has already gone before. In that case it is my suggestion arrangements should be made with the central stations and vehicle manufacturers to supplement the advertising of the association along definite predetermined lines; these arrangements to be made before the beginning of the next campaign and that they should not be left to the mood or inclination of the general station management or manufacturer to co-operate or not as he sees fit.

The importance of this plan cannot be overestimated—supplemental advertising is vital to the success of any plan and particularly to this one, where the amount is as small as that now available. Properly handled, I believe you will have no difficulty in securing the co-operation of those interested—our station, I know, will gladly work with such a plan.

It may be, gentlemen, that you expected me in discussing this subject of advertising to talk about copy and cuts and psychology and media, etc., as so many people consider the ad man to be nothing more than a mere writer of pretty phrases. But, gentlemen, advertising is not literature—it's business; and the job of making a man put his hand in his pocket and pull out money to buy your goods is a bigger job than many folks imagine, as the success or failure of that job depends upon many other factors far more important than that of writing pretty phrases.

In central station advertising of electric vehicles is one of those factors just mentioned and a most important one at that, the service that should follow the sale of every vehicle.

Modern business methods demand that there shall be six essentials to every sale, the sixth and most important of which is that the goods sold shall be satisfactory—in other words, that the article sold shall give service—and in the electric vehicle business this means that you should provide the purchaser with a service in the way of maintenance that will insure his continued satisfaction, and that you are not now doing nor are you prepared to do so, hereabouts.

In view of this fact it is distinctly inadvisable for the central station to advertise extensively the electric vehicle until such a service shall have been provided or unless it is prepared at its own expense to supply this service. It is inadvisable because without this service, satisfaction is impossible, as Mr. Davenport pointed out. The central station cannot afford to promote the sale of anything that would be a reflection upon the company, and vehicles sold under such conditions certainly would be such.

Gentlemen, we cannot build up a permanent, satisfactory business in competition with the low priced gasoline vehicle unless we are prepared to provide this service, and the central station at the present time cannot afford to assume the whole burden of the service because its income derived from the sale of current is insignificant.

There is, however, a practical way out of this difficulty, and that is quite a simple one. I think you will agree that the logical party to supply this service is the central station, and it can and will do so; but the manufacturer should reimburse the central station to the extent of allowing it a certain sum for every vehicle sold in its territory; say from $50 to $100 depending upon the size of the car sold.

The manufacturer then could advertise this service arrangement, and it would prove to be very valuable selling feature; that he would furnish a service guarantee which would be made good by the central station. Thus would be eliminated all those questions and doubts now existing in the minds of the vehicle prospects, making it possible for the central station aggressively to push this business to its own and the manufacturer's gain, knowing that it and the manufacturer would make good to the satisfaction and profit of all concerned.

Borland Service Station in Chicago

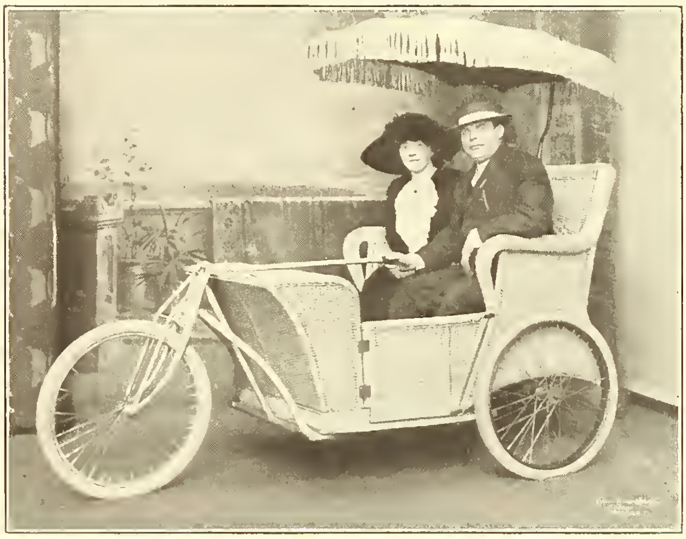
Realizing that service after a car is sold is fully as important with electric automobiles as gasoline cars, the Borland-Grannis Company has recently opened a service station on Calumet avenue, a short distance from its Chicago retail salesroom, which is located at 2634 Michigan avenue. Service on Borland electric cars was formerly given from the retail salesroom and the company's factory on East Huron street, but owing to the large increase in the list of Borland owners in the past few months, the Borland-Grannis Company has taken hold and equipped what is recognized as one of the best electric service stations in the state of Illinois. Recently the Borland-Grannis Company wrote letters to Borland owners in Chicago, asking that owners leave their cars for a few hours one day of each month at the Borland service station for inspection and any adjustments that might be necessary, all inspection service being gratis, and the prompt response and co-operation of owners has been most agreeable to this flourishing company.

No garaging is done by the Borland-Grannis Company in the service station, and a competent corps of inspectors is on duty each day to give any service that may be required on Borland electrics.

The Borland-Grannis factory on East Huron street is one of the busiest automobile factories in the state of Illinois at this time, and the Borland product is rapidly gaining a national reputation.

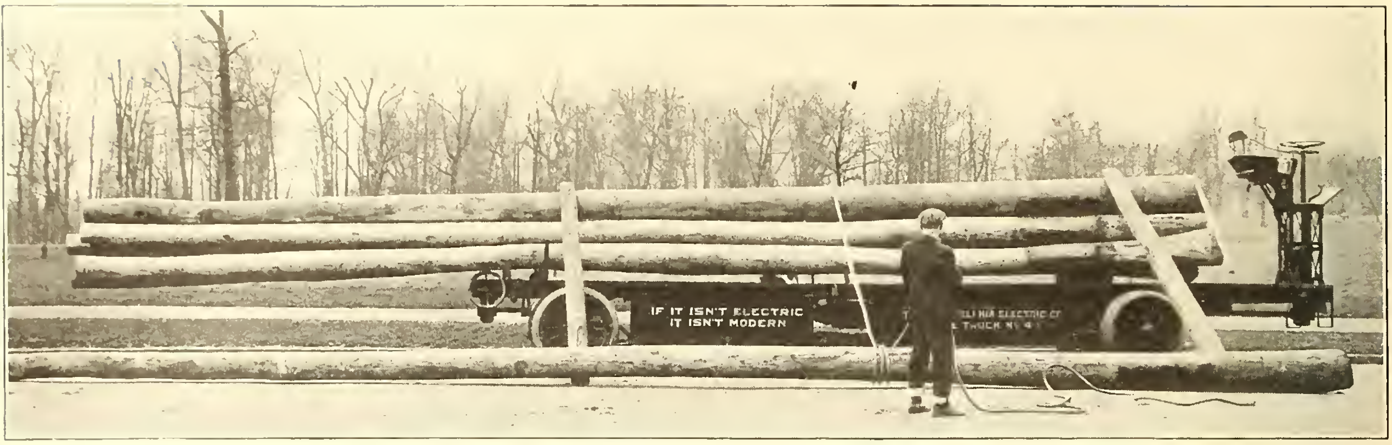
Electrically Operated Roller Chair

Board-walk enthusiasts of Atlantic City and other fashionable seaside resorts, who have enjoyed the roller chair propelled by human power applied in pushing it, will be furnished with an innovation in the new electric motor chair devised by Charles B. Chrysler of Chicago. The chair is well and substantially built and presents a good appearance. The willow wicker body of the chair accomodating two passengers, sets upon a chassis of much the same type as that used in a motorcycle. The wheels are of regulation bicycle construction, with pneumatic tires. The chair is equipped with an Edison battery of 10 cells and a Westinghouse ⅜ horsepower motor that transmits to a chain and sprocket connected to the rear axle.


The Chrysler Electric Roller Chair.

The operation and control of the chair is very similar to that of an electric pleasure car. The speed ranges from 4 to 6 miles an hour or a little better than the average time consumed in walking. The many advantages of the electric motor chair over the old-fashioned hand propelled chair will undoubtedly cause the gradual disappearance of the latter from the places where they are now in vogue, to be replaced by the electric type.

Two new electric vehicles, a patrol and ambulance, have recently been added to the equipment of the city of Memphis, according to D. E. Whipple, manager of the Chicago branch of the Anderson Electric Car Company. Both machines are Detroit electrics. Both are in the official color, orange.

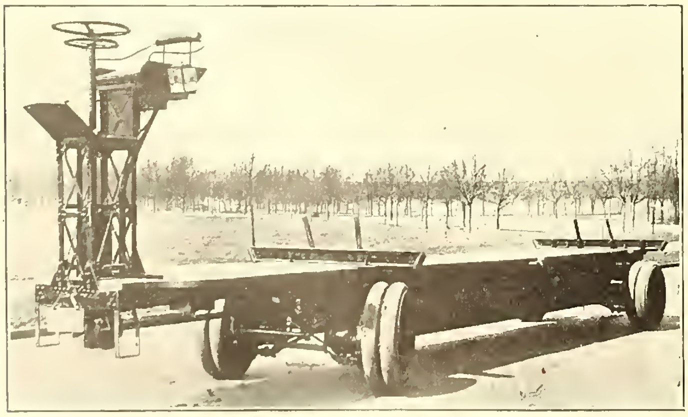


Loading Electric Light Poles on the Philadelphia Electric Company's Special Commercial Electric Truck.

Novel Pole Truck in Use in Philadelphia

The many obstacles confronting the transportation of large poles has led the Philadelphia Electric Company to adopt a new type of truck to relieve many of the trying situations that arise in narrow congested streets, a horse-drawn vehicle that had been used had so many disadvantages in the haul of long poles in the matter of making a turn and in unloading, that it entailed a great amount of time, labor and expense. To bring these conditions down to a minimum and as near perfect as possible, a special truck was manufactured by the Commercial Truck Company.

This truck, now in use, seems to embody every detail hoped for and it has become a decided success in the handling of the long pole problem. The truck itself has a loading capacity of 6 tons and when unloaded weighs close to 12,000 pounds. The wheel base is 20 feet and its length over all exceeds 30 feet. To provide as limited a turning radius as possible it has been equipped with portable rear wheels operated by means of a steering gear on the side, which, when the wheels are neutral and in the same plane as the front wheels, automatically closes and the truck is guided entirely by the front steering wheel. That the greatest amount of traction possible might result the truck was equipped with a four-motor drive, exide batteries being used. Loading and unloading is effected by an electric drum in the center of the truck controlled from the seat by a system of levers. The speed of the truck is 7 miles an hour on the level with a complete load. Due to the extreme length of the truck and to the fact that a considerable portion extends over the front wheels it was deemed necessary to equip both front and rear wheels with brakes so that in running down grade the heavier front, which would have a tendency toward causing the truck to accelerate in speed, could be controlled if pressure was applied to both front and rear wheels.



Philadelphia Electric Company's Special Commercial Electric Pole Truck.

The new truck is doing a great deal toward educating the people of Philadelphia and vicinity in the latest possibilities of electric trucking and wherever the truck travels it becomes the object of much comment and interesting study.

Safety in Driving Electrics

Public indignation in Chicago has been aroused in the last few weeks by a series of tragic automobile accidents, which has brought out in striking form a new motor car peril. Almost without exception these accidents—a number of which resulted fatally—were due, not to the careless driver or the speeder, but to the inexperienced pilot—the new owner of a machine who was cautious enough, but who was not able to cope with the complicated mechanism which controlled his car.

A significant fact about these accidents was that not an electric figured in any of them.

In one tragedy, a new owner of a gas car was driving along a boulevard when a child suddenly darted out in front of the machine. Although the driver had ample room in which to stop or turn aside, the thought of danger to the little one coupled with his lack of knowledge about the guiding mechanism caused him to lose control of the machine. The result was that the child was run down and killed.

The trouble has been that too many have purchased cars which could be manipulated safely only by a skilled pilot, taken a few lesson in driving it and then gone out on the street as a capable pilot of a machine which possessed possibilities of great risk to him and others, unless properly handled.

With the growing popularity of motor vehicles and the increase in the number of them on Chicago streets, it can be seen readily what a danger there is in having inexperienced drivers at the wheel of cars which require a skilled chauffeur to operate with perfect safety.

This points out in striking fashion a lesson to which motor car enthusiasts are fast awakening—the absolute necessity of having a car that is understandable; a car without complicated steering or guiding apparatus; a car that is responsive to the slightest pressure on the lever.

This is one of the features of the electrics that is appealing strongly to prospective motor cars owners—

the fact that it is a car that any member of the family can handle with perfect ease, safety and confidence.

In the Borland electric, for example, the manufacturers have aimed to produce a car in which the driver always has its control at his or her fingers' end. The mechanism is simplicity itself. There are no engines, pumps or other complicated contrivances to get out of order and cause the car to balk. There is nothing to confuse the driver, even when operating on congested streets.

Another feature of the Borland is that any grown member of the family can learn to operate it. Too often when a family owns a gas car no one but the husband or the eldest son can operate it. The result often is obvious inconvenience when other members of the family would like to use the car.

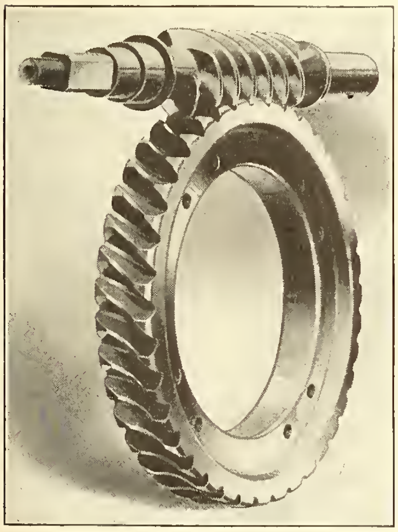
The fact that its absolute safety and simplicity make it equally easy for men and women who are inexperienced drivers to operate it is another reason for the popularity of the Borland as a family car. The coupe model is especially adapted to just this purpose. It is roomy—having seats for five—and may be used for either business or pleasure purposes.

For those who desire the racy lines of the popular type of gas car, with the electric's ease and simplicity of operation, the Borland-Grannis Company manufactures a roadster model. This car is capable of developing good speed, at the same time retaining all the obvious advantages of the electric.

Rauch & Lang's Worm Drive

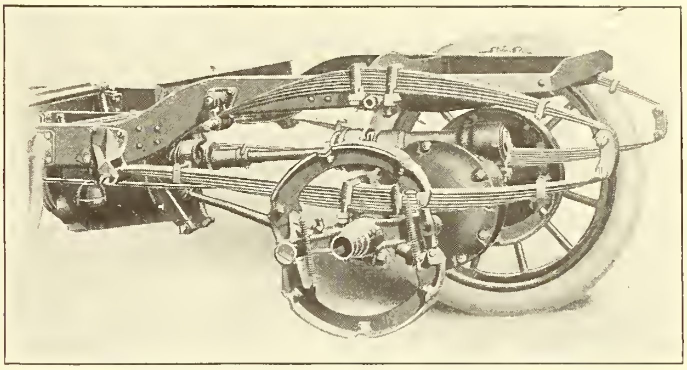
With the increasing popularity and growing demand for electric pleasure cars, many radical changes and improvements have taken place in their construction. One of the things that has attracted considerable attention is the worm drive. The successful result of experiments in this line is shown conclusively in the product of the Rauch & Lang Carriage Company.

The worm and gear are mounted in a single casing and adjusted to the axle, ample provision being made for filling and draining the oil in the rear axle housing. A Rauch & Lang-Hertner high-speed motor is used in these pleasure cars.

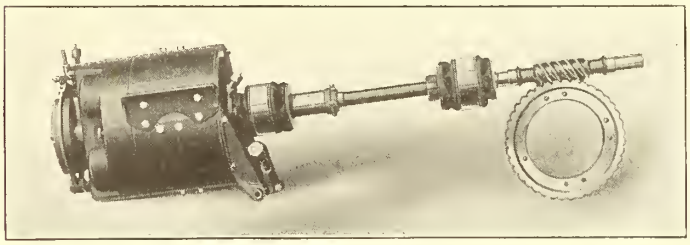


The Rauch & Lang Worm and Worm Gear.

The propeller shaft is fastened directly to the end of the armature shaft by means of a universal joint and another universal joint is fastened on the opposite end of the worm shaft. The object in employing universal joints is to produce more flexibility. That much friction and strain on the axle might be eliminated, a torsion rod is fitted to the rear axle and motor below the propeller shaft. On the forward end of the torsion rod connection is made by means of a ball and socket joint with the top of the torsion rod link which in turn swivels on the rear motor yoke. This rod permits the free movement of everything that is connected with it but holds rigid the housing of the axle which then cannot turn on its own axis. The amount of power lost is negligible in the operation of the car. A notable point of interest in the construction of the worm drive is the adoption of rear springs of entirely new design. They consist of two ⅞ elliptics connected at their rear end by a different arrangement from that ordinarily used. The new methods used permits more resiliency in the movement of the car. The spring is attached to the axle from three positions. The idea in the three-point attachment is to minimize the jarring and jolting effects produced by sudden turns made with the car. The Rauch & Lang worm drive car marks the introduction of a new type in the electric vehicle field and the acceptance of this type of drive depends largely on the way in which it meets present-day conditions, when efficiency, economy and long life of electric cars are the things that are uppermost in the minds of present owners and prospective purchasers.



Rauch & Lang Driving System and Spring Suspension.



Motor-Propeller Shaft with Worm Gear.

Electric Trucks Stand Severe Tests

Recent performances of electric commercial wagons and trucks in New York and the neighboring cities of Newark, Jersey City, Elizabeth and Passaic, N. J., have been recorded and compiled by the Atlantic Vehicle Company. These records are complete, covering mileage, tonnage of the trucks, battery charging, running time and speed between designated points. That the electric truck is more than living up to predictions by its most enthusiastic follower, is attended by some results that have been accomplished lately with trucks owned and operated by some of the larger mercantile and business houses in Greater New York and its environs. The following examples show what has been attained with Atlantic trucks.

On April 28, 1913, an Atlantic one-ton truck owned by A. Lilznic, New York, completed a day's work of

57 miles, there still remaining 6 or 7 miles in the battery. A five-ton Atlantic truck of the Kiper Bay Brewing & Malting Company, 37th street and 1st avenue, New York City, covered a distance of 52 miles on May 5th and 6th, on one charge of the battery. The battery still possessed 8 to 10 miles. On May 14th a 3½-ton truck owned by the General Chemical Company of Newark, carrying a full load, covered a distance of 61 miles on streets in Newark, Elizabeth and Harrison, N. J., respectively. On May 15th a 5-ton Atlantic truck owned by Pickey Bros., New York, covered 56.8 miles in Brooklyn and lower New York. About one-half of this distance was run on wet, slippery streets; several miles in battery were unused.

On May 16th the best record so far attained by the Atlantic Vehicle Company was established when a 3½-ton truck, with full load, covered a distance of 30 miles. The truck was then unloaded and sent out to cover an additional 59 miles, making a total of 89 miles covered for the day. The average running speed of the truck on this test showed 9¼ miles. The truck was equipped with an 81 horsepower Exide battery.

Demonstrating Truck at Exposition

The makers of electric cars certainly have the advantage when it comes to demonstrating during show time. Last year some of the enterprising ones, among them Sam Menafee of the Detroit Electric Company, conceived the idea of using an electric demonstrator on a small track in the balcony of the Grand Central Palace.

This idea will be carried out further this year at the electrical exposition at the Palace, October 15 to 25. At this show every effort will be made to acquaint the public with the advantages of the electric vehicle for both pleasure and business. Not only will cars be shown, but all of the appliances necessary for their efficient operation will be exhibited.

Surrounding the demonstrating track will be charging stations where space for either vehicles or appliances will be available. The track will be in charge of a special committee of the New York Electrical Vehicle Association which will conduct special runs and tests to demonstrate the utility of the electric vehicle.

Chicago Electric Agency for Indianapolis

The Indianapolis, Ind., agency for the Chicago Electric has been taken by the J. F. Wild Auto Company, 15-17 East Pratt street. The company is formed by J. F. Wild and Niel Campbell and has opened a garage and service station.

The company will act as the distributer for the car throughout central Indiana, the territory extending from Fort Wayne to Terre Haute. Mr. Campbell will have charge of the active end of the business and says that he sees a great future for his new car throughout the state.

The car was designed by Chief Engineer Newman of the Chicago Electric Company. He is the man who is said to have built the first solid tire electric ever seen on the streets in the country.

Woods Electric Pulls Cars Up Incline

The hill climbing and traction power of the Woods Electric was very practically demonstrated at the Southwest Michigan automobile show, held at Kalamazoo recently. The exhibition was held on the second floor of the Knights of Pythias Auditorium, and as there was no elevator in the building a temporary incline of rough planks was improvised, extending from the street to the second story of the building. The Woods Electric demonstrating car, driven by A. H. Snook, the local agent, was used to tow the gas cars, great and small, up the incline and onto the second floor of the building. A big Hudson six was one of the heaviest cars pulled in.

The story of this remarkable performance of the Woods Electric was widely circulated, and caused an unprecedented amount of interest to be taken in the electric cars exhibited by Mr. Snook. It was a revelation to the gas car people as well as the many spectators, that an electric car, even one as sturdily built as the Woods is known to be, could develop so much power and perform a difficult feat of this kind.

Electrics Gaining Favor in New York

Statistics recently gathered and completed by an association in New York, the Automobile Bureau, indicate the sturdy and healthy growth that makes the electric commercial truck and wagon in the metropolis within the space of a year. Among some of the more prominent houses in New York who have put their stamp of approval on the electric truck and commercial wagon by the increase in their present quota, are as follows. Hoffman Brewing Company ordered six General Vehicle cars; Best & Company, six Baker cars; Riker, Hegeman Company, one General Vehicle and one Detroit; and the Herringbone Metal Lath Company, one General Motor truck.

The equipment of electric vehicles with wire wheels is going to popularize to a greater extent the solid cushion tire, according to P. M. Pontius, tiremaker.

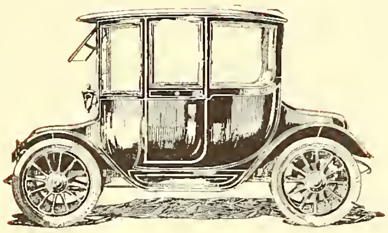
"The spokes on wire wheels are much closer together than on wood wheels," said he recently. "The result is that the shocks are more evenly distributed. With the least jar they have a tendency to give. In this manner the shock is partially absorbed which would otherwise be taken up by the tire. Electric car owners who have been prejudiced against solid equipment will be more readily convinced of the cushion tire's resiliency when machines are equipped with this kind of wheel."

In recognition of this fact, the conservative members of the Canadian parliament decided a short time ago to present to Mrs. Borden some token of their esteem and appreciation. Knowing her enthusiasm for outdoor recreation, they decided that no more profitable gift could be made than an electric brougham.

The committee in charge studied carefully the leading makes of electric cars displayed in Ottawa, and after a thorough investigation selected the Ohio electric.

O. S. Marx and R. S. Woodhull of the Ohio Electric Car Company happened to be in Ottawa at the time the presentation was made and report that the committee in charge purchased an Ohio electric car in the regular way.

The ingenious printer, on whom ever falls the censure for oversights of the editor, set a line under a cut at the top of page 46 in our July issue, reading "Seven-Ton Borland Coal Truck." This legend was all right except for the fact that Borland has not yet designed any large trucks, and the one in the picture was made by the Commercial Truck Company of America, and belonged to the Hudson & Manhattan Railroad Company.



The Borland Electric

For general service for all the family, this roomy, comfortable Borland Coupe meets every need perfectly the year around. Comfortable seats for five —*all* facing forward; simple, easy, horizontal control from either the front or the rear seat; six forward speeds and three reverse. Automatic cut-out disconnects power when emergency brake is applied. EXIDE batteries standard equipment. $2900.

The Borland Electric Roadster—a speedy, trim-looking car—with open body and wheel steer is ideal for business or professional man, $2550.

Send for the new Borland Poster Book illustrating and describing the Borland Electric Models.

The Borland-Grannis Co.
Chicago Salesrooms: 2634 Michigan Avenue
310 East Huron Street, - Chicago

Business Promotion Through Trade Press Efficiency

is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

Eighth Annual Convention of the Federation of Trade Press Associations in the United States at the Hotel Astor, New York, Sept. 18, 19, 20, 1913

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from
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WM. H. UKERS, Chairman, 79 Wall Street, New York

The Federation of Trade Press Associations in the United States
A. M. Swetland, *Pres.*, New York E. C. Hole, *V. P.*, Chicago
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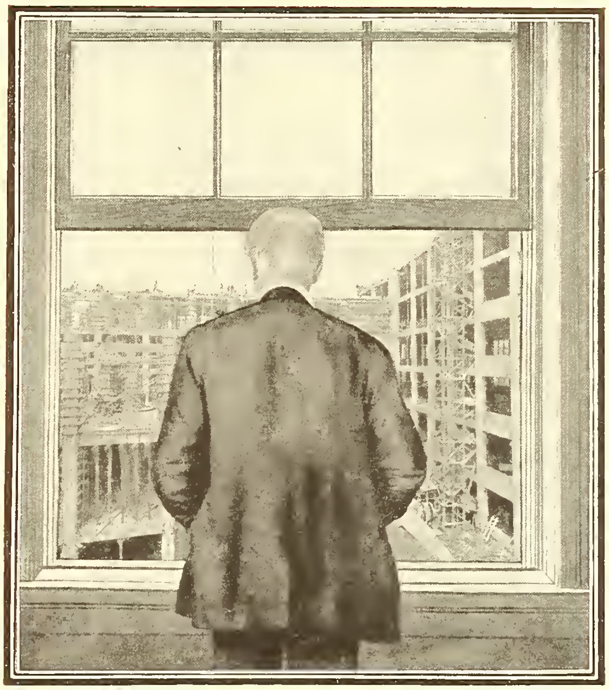

Looking out at the new factory extensions made necessary by our increased business reminds me of my prophecy that the Alkaline Storage Battery would bring about important changes in Transportation

Thomas A Edison

Edison Storage Battery Co.
170 Lakeside Ave. Orange, N. J.

EMC
ESTABLISHED 1907
PUBLISHER
TECHNICAL MAGAZINES
AND TECHNICAL BOOKS

ELECTRIC VEHICLES

Vol. 3 CHICAGO, AUGUST, 1913 No. 8

BAKER MOTOR VEHICLE COMPANY'S ROADSTER MODEL

Do You Believe in Boosting?

¶ *With the co-operation of real live Central Stations throughout the Country we have, for several months, been compiling names of every individual in their territories who uses electric current for charging purposes.*

¶ *For the manufacturer of Electric Vehicles and accessories this list is indispensable. It has been acquired with the distinct understanding that it will not be sold for circularizing purposes. To obtain its benefit your advertising announcements should appear here.*

¶ *Electric Vehicles—the magazine you have in your hand this minute—is being read by these users of the Electric Vehicle.*

Your Advertisement Should
Be Staring Them in the Face

¶ *Send Your Advertising Copy now for the September Issue of Electric Vehicles.*

Published Monthly By
ELECTRICITY MAGAZINE CORPORATION
Monadnock Building CHICAGO

Entered at Chicago Post Office as Second Class Mail Matter

ELECTRIC VEHICLES

WITH WHICH IS INCORPORATED IGNITION
TRADE MARK REGISTERED IN THE UNITED STATES PATENT OFFICE

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Foreign - - $2.00

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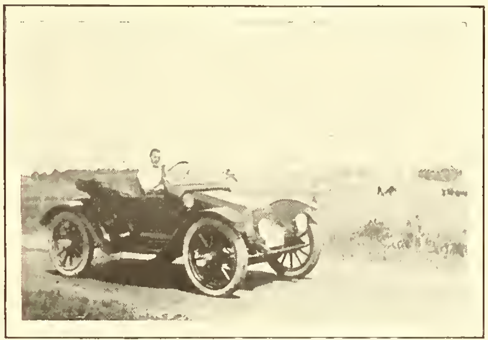
Volume III **CHICAGO, AUGUST, 1913** **Number 8**

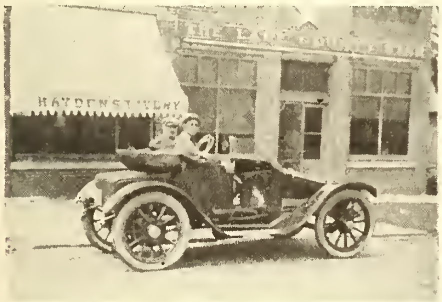
Chicago to Cedar Lake in an Electric

Borland Roadster Makes the Round Trip on Single Charge

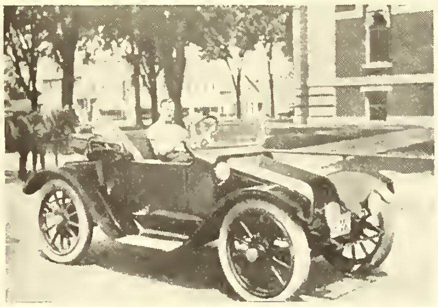
BY FRED B. SCHAFER

THE day of the electric tour has arrived. Heretofore the electric has been confined to city uses, the city boulevard system acting as a boundary line. Short trips and a guarantee of a recharge, if necessary have satisfied the public that unexcelled luxury could be found in an electric vehicle. Society, professional and business men have proven its success as an efficient, reliable mode of transportation for city streets; in fact, the industry had never reached beyond the city bounds. However, central stations are extending into the country districts, establishing public charging stations. Developments have progressed so rapidly that at last we find electrics touring the country, mounting hills, overcoming poor road conditions and returning on the original charge after having covered perhaps a hundred miles of hill and dale.

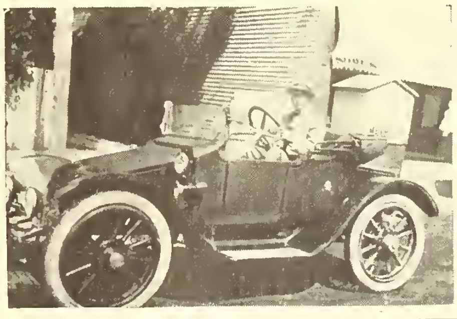

On the St. Johns Road to Cedar Lake.


Passing Crown Point's Newspaper Office.

At Cedar Lake.


The Courthouse at Crown Point.

For one verification of these encouraging facts we have an accurate account of a remarkable run made by a Borland roadster driven by Richard Mansell, retail branch manager of the Borland-Grannis Company. The run, said to be the first ever accomplished by an electric, was the feature of the day at the picnic of the Electric Vehicle Association and the Garage Men's Association held at Cedar Lake, Ind., Friday, August 8.


The Run Through Dyer.

Mr. Mansell, with Mr. Bird of the Exide Company as a passenger, left the Royal Garage, Chicago, at 7:30 A. M., making their first important stop at Crown Point. The view from the car was interesting at all points passing at times through small suburbs, then again through the open meadow lands. The condition of the road was excellent; in fact, the entire trip was covered on high finished gravel roads. The speed was never changed except that occasional stops were made to take pictures of points of interest along the road. Mr. Mansell notes that the roadster was an object of much curiosity along the countryside, where a car of this type had never been seen before.

After passing through St. Johns and Dyer the electric negotiated a hilly section just before entering Crown Point, arriving at the county seat at 10:30. At 11:45 the roadster left for Cedar Lake through a picturesque country and this section of the run was no doubt the most severe test of the trip. Abrupt turns in the road immediately followed by steep hills caused some anxiety, due to the fact that the roadster was obliged to retain its uniform speed in rounding the bends, in order to mount the immediate hillside.

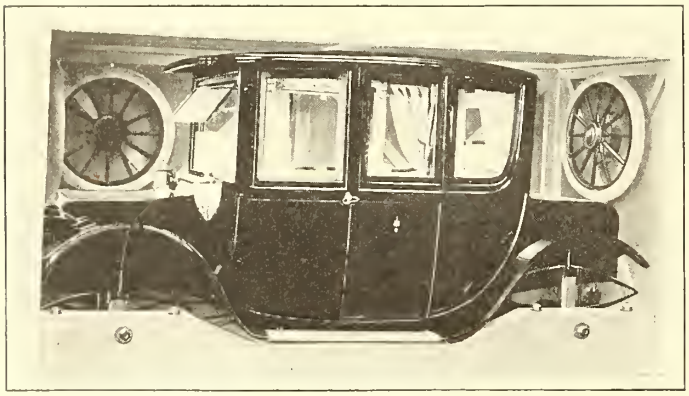
Cedar Lake was reached at 12:05, the electric creating quite a sensation, especially amongst the great number of picnickers who had, earlier in the day, passed in gas cars, doubting the ability of an electric to accomplish the run.

At 6:20 P. M. Mr. Mansell drove out of Cedar Lake. Many of those present expressed their doubts as to whether the electric had a sufficient charge left to complete the run. Just before arriving at Crown Point he was greeted by a fleet of motor enthusiasts who, having heard that an electric was making a run to Cedar Lake, congratulated him on his success and conveyed him through the town. After a stop of an hour for dinner the trip was again resumed, arriving in Chicago at 11:30.

The entire trip was made on a single charge, using a 42 cell, 11 plate Hycap, the voltage dropping but two points. The electric was checked at three successive garages namely, the Elite, the Hyde Park and the Royal Electric, the last check showing a total covered distance of 97.2 miles at an average speed of twelve miles an hour. We must recognize and appreciate such a severe test and its successful conclusion.

Waverley Boxed for Shipment to Japan

Boxing a $3,500 automobile for shipment to a distant part of the world is an important piece of work, since electric automobiles are not primarily designed to be lifted by derrick and dropped roughly down the hatchway of an ocean going ship.



Waverley Packed for Shipment to Japan.

Within a week two such shipments have been made from the Waverley factory at Indianapolis, one going to Lima, Peru via New York, S. S. Allianca to Colon, across the isthmus to Panama and then down the west coast of South America by steamer again to Callao.

The second shipment, shown in the accompanying picture, was of a Model 98 Silent Waverley Limousine-Five shipped via Chicago, and Seattle in care of the Japanese line at that port to Yokohama, Japan, for delivery to the purchaser at Tokio, Mr. Kuhara, President of the Kuhara Mining Company.

The illustration shows this car with wheels removed and axles resting in a heavy oak frame work that is bolted to the outside box. The latter is built of matched pine with a lining of tar paper, firmly braced and all very substantially constructed. The batteries, which in this case were of Edison type, were packed in separate boxes, the electrolyte being contained in two steel drums.

The correspondence which resulted in the sale of this car was begun by the Waverley Company in the Japanese language. Five other languages are regularly used by this company in its foreign correspondence, viz., French, Italian, Spanish, Portuguese and German.

Large Part of Road Building Funds Wasted

The Office of Public Roads of the Department of Agriculture is making a strong effort to focus the mind of the country on the fact that maintenance and effective repair are of equal importance with the actual improvement of bad roads. Investment of money in new roads does not become real economy until provision is made for keeping these new roads in condition after they are built. If a new road was built and then allowed to fall into disrepair, much of the original investment is simply wasted.

Europe, generally speaking, is ahead of the United States in the matter of road improvement, but Great Britain is struggling with a problem similar to the one that confronts the people of the United States. In England, Scotland and Wales there are no fewer than 2,140 separate authorities who between them, administer 175,487 miles of roads, or an average of only 82 miles apiece. In Scotland, apart from the big cities there are over 200 burghs, one-half of which have but 10 miles of road apiece to maintain. Needless to say, such a minute mileage is insufficient to keep the road plant fully occupied all the year around, and renders the employment of a skilled engineer impossible for economical reasons.

Officials of the Office of Public Roads when called upon for assistance by the various states are pointing out that road building is an art based on a science, and that trained men and experienced men are necessary to secure the best results from the expenditure of road funds.

Statisticians have found that although the average expenditure on the improvement of roads exceeds one million dollars a day, a large portion of the money in the United States is wasted because of the failure to build the right type of road to meet the local requirements or the failure to provide for the continued maintenance of the improvement.

The various states and counties within the past six months have taken a greater interest in road improvement than ever before in the history of the United States, and there is now a strong movement to conserve the roads of the country where they are improved. Scientific maintenance will be one of the chief features of the work of the Office of Public Roads throughout the present year.

Electric Is a Phoenix

Among the electric cars in Bland's garage on East Forty-seventh street, Chicago, which burned to the ground last May, was a 1912 Woods electric of the model known as 1316. This car, with a number of others, was left in the ruins for over two months after the fire. When it was removed from underneath the rubbish, most of the top of the Woods car it was found had been burned away and all the lighter metal work, such as the fenders and lamps, were badly twisted and bent out of shape by the heat.

Notwithstanding all this car had gone through in the fire the fact of its having stood buried in the ruins for such a long time, it was still in running order and was used to tow a number of other cars out of the building.

How a Chicago Woman Runs a Big Garage

A Talk with Miss Lang of the Lake Shore Auto Station

BY MABEL CONDON

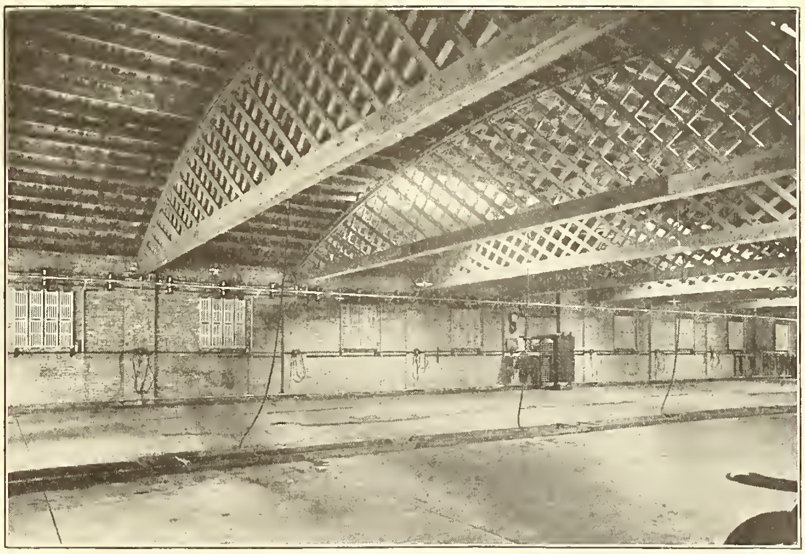
“WHY don't you go out and see Miss Lang at the Lake Shore Auto Station?” somebody asked not long ago. I said I would, and didn't. Then, just the other day, I met a former Waverley salesman in front of the postoffice and he said, “You ought to go out and see Miss Lang—she pins up her skirts, puts on rubber boots and works right with the men, when necessary.” That afternoon I went out to see Miss Lang.

Some of the Electrics Accommodated at Miss Lang's Garage.

Her station at 1512 to 1516 North Clark street, Chicago, is just one block south of the entrance to Lincoln Park; its facing is of red brick with white trimming and there's a white lace curtain at the white-sashed window of the office and another lace curtain at the glass panel of the white door. Within, the lower part of the ten by ten inclosure is painted white and the upper part is of glass.

A view of the office through the screen door which opens off of the garage, disclosed a fat white dog curled up in a black leather chair. But there was no Miss Lang. An attendant set off in search of her and I followed, for the reason that, if Miss Lang were going to be found under a car or charging a battery, I wanted to be present at the finding.

“Miss Lang,” called the youth with me and a dainty little woman, in a white dress with black wavy lines through it, emerged from a sort of annex to the big station; she was wiping her hands on some waste cloth and smiled at me from behind her glasses in a way that made me feel she had known me for months, at least. She led the way to the office, ousted the watch-dog from his slumber nook in the big chair, wiped it off and invited me to be seated.



Side Wall Showing Charging Panel and Radiators.

“I didn't get that chair for Patsy, though he seems to think I did,” she said as the deposed Patsy crawled under the desk to resume his nap.

“I suppose you're wondering why I'm not a big, husky person?” she asked with a laugh in her quick, clear voice and her twinkly blue eyes. I confessed my surprise at not finding her so and she said that most people are shocked when they meet “the woman who runs the auto station” for they all expect that she will be “husky.”

But Miss Lang is a pleasing disappointment as to “huskiness.” She is not more than five feet three inches in height, is slender and very quick in all she does. Her hair is a soft, pretty brown and she rolls it into a big knot at the back of her head; her eyes are very blue and very direct and her mouth straight, but not primly so. She likes to laugh and transmits the contagion to the extent that, after ten minutes chat with Miss Lang, you feel you have had the best time.

And I guess that people would proclaim anybody, who comes out ahead in a dispute with an architect and a plumber, a good business person, would't they? Well, that's one of Miss Lang's accomplishments—getting what she orders. And when she finally got it in the way of her model electric station, she paid her bills and gave this advice with it, gratis: “The next time you have a job to do for a woman, give her what she orders and save yourself a lot of wasted time and expense.” The architect was “out” $125 and the plumber $150, so maybe they took her advice.

One would have to make more than three guesses to guess that Miss Lang's occupation, before that of physician to electric car, had been dressmaking.

“Rather a big step, wasn't it?” I gasped when she told me.

“Well, rather,” she answered with thoughtful look that took her back four years to the days when she gave people the nerve-racking things they ordered in the way of surplice blouses, gowns that clung, that buttoned outside and hooked underneath and for which nobody was ever grateful—nobody ever is grateful to a dressmaker.

"It was an awful life," commented Miss Lang. "I wouldn't go back to it for anything. Yet, when I left it to go into this business, my family held up its hands and said, 'She's crazy—who ever heard of a woman doing such a thing?'

"At that time I didn't know anything about electric cars, but I had some money to invest and knew a woman who owned a little electric station on State street, near Oak and Walton, and who wanted a partner. Her nephew was running the business for her and she was losing on it, right along. I bought the partnership and managed the business myself and learned an awful lot that first year. At the end of that time, the business had more than doubled, we were then caring for 25 cars, and at the end of the second year we had 56.

"The old saying that 'women can't agree in business,' proved itself true and I bought out the interest of my partner; meanwhile I had three real estate men looking for a site for me for a bigger station. I got tired waiting for them to find one and one day started out to look for one myself and found this place. It was the old Kreutzmer Garden, the first summer garden on the north side. When I got back to my office, I called up the agent, asked how much he wanted for it and within two weeks, ground was broken.

"Though I hadn't had time to visit other stations and get ideas as to their construction, I knew what I wanted and ordered it built according. Lots of water and lots of light were the two essentials and it was in getting these that I had trouble with the architect and the plumber. However, I got them." And a laugh accompanied the recollection.

"It's just two years ago this fall that I moved in here," went on the station's plucky owner, "and since then we've been busy day and night; we never close. There are from twelve to eighteen men employed here all the time and the number of cars is 108. To us, the worst feature of the business is that of calling for and delivering the cars, while to patrons it is one of the best."

A smart looking electric drove up to the curb, just then, and its occupant beckoned to Miss Lang, who hurried out and, after a few words with the lady in the car, got in and drove off down the street.

Meanwhile, I took note of the framed wording over Miss Lang's desk, "A knocker never wins and a winner never knocks," watched a man maneuver two newly polished cars and enjoyed the comfort of the "company rocker."

"She thought the foot brake was too tight, but it wasn't," explained Miss Lang as she returned a few minutes later.

"Wasn't it dreadfully hard to learn all about fixing a car and knowing just what the trouble is, whenever there is any?" I asked and Miss Lang answered: "No; when a business is your own, you just naturally want to take care of it. I did and I determined that nothing the men did about a car was too hard for me to do, so I learned everything there was to learn to it. I can take the place of any man I employ and I do it, often—every one except the washer and I generally manage to get somebody to do that.

"But as to knowing what's wrong with a car, that's easy; you see, you just go by symptoms; the way it runs, the sound of it—all of that tells."

There was a movement under the desk; Patsy got up, stretched himself, did a tour of the little room to make sure that all was as well as it looked, and returned to his quarters at Miss Lang's feet.

"If it's not an impudent question—how do the men seem to like working for a woman," I inquired, wondering how I'd like it, if I were a man.

"The fact of my being a woman doesn't seem to make any difference," answered Miss Lang and, in her quick way, added, "An employer is disliked anyhow, so I don't think it matters that I'm Nettie Lang instead of 'Mr.' Lang.

"Ever have trouble with them?"

"The men?—well, its pretty hard to get a capable night force. Men with families and young men don't want to work nights, and I don't blame them."

The telephone rang; somebody wanted her car immediately. Miss Lang sent one of the boys with it and then took me on a survey of the station. It measures 70 by 150 feet and has a high trellised ceiling from which swinging lights depend. The floor is a cemented one having "one inch of cement on the top instead of just one-quarter of an inch, as is so often the case," said Miss Lang.

"I use Edison current for charging," she continued as we came to the big charging stand, "and we can charge fifty cars at one time. I'm very particular about the use of the board," caressing the layers of fine coil that looked like broiling plates only thicker. "With care, this should last a long time; I never let any of the men at it when they're 'green,' they have to know all about it first."

In addition to this section of the station, there is an "annex"; it is a portion of the summer garden's old restaurant and has a gabled roof; dogs and rabbits perform a chase, in colors, around the top of the wall, and from one end, a little balcony overlooks the twenty-five cars housed in the "annex" and from it, a detailed view of the construction of the steam plant might be had.

The wall radiators are among the station's "last words." Miss Lang is rather proud of them because they were an experiment in the idea of the return and the main being on the same connection and worked out beautifully.

Miss Lang isn't taking a vacation this year; hasn't for four years really, so you'll be apt to see her any time between 7 a. m. and 7 p. m., if you're in the vicinity of the Lake Shore Auto Station. And maybe she'll tell you how, four years ago, her belief in the electric car as a future favorite, out-balanced the criticisms and warnings of friends and is responsible for her work and the success of the big station.

Anyway, it's worth a trip as far as the Lincoln Park entrance to hear Miss Lang laugh.

Prominent Railroad Man Buys Detroit

President L. E. Johnson of the Norfolk & Western Railway recently made a special trip to Detroit in his private car for the express purpose of going through the factories of the Anderson Electric Car Company to assure himself of the quality built in the Detroit electric.

President Johnson is a man of large practical mechanical experience and, advised by his own engineers, went thoroughly into the materials and manufacturing methods employed by this concern. This examination, followed by a road demonstration, made of Mr. Johnson a Detroit electric enthusiast. He purchased on the spot a gentleman's roadster, Model 39, fitted with Edison batteries.

Picnic of Chicago's Electric Vehicle Men

Chicago Section E. V. A. and Garage Men Frolic at Cedar Lake

BY W. J. McDOWELL

AN EVENT to be pleasantly remembered many a day was the picnic and field day conducted by the Chicago Garage Owners' Association and Electric Vehicle Association of America, at Cedar Lake, Ind., on Friday, July 25. It was a grand success in every sense of the word. One hundred and fifty people came by train, and ninety-five people came by automobile. There were nineteen automobiles, one of them being a Borland electric roadster, which made the trip going to Cedar Lake and return and kept up the pace with the gasoline cars every inch of the way. Just after arriving at the grounds an excellent chicken dinner was served. After which the athletic events took place, the first event being the base ball game between the Chicago Garage Owners' Association and the Electric Vehicle Association, the score being 12 to 1 in favor of the Vehicle Association men. The Vehicle Association team consisted of the following men:

E. E. Lunn, W. Holland, L. E. Wagner, C. B. Frayer, E. J. Kilbourn, Mr. Mesner, H. E. Niesz, H. J. Butler and G. A. Freeman.

All of the team received individual prizes and the umpires also received prizes. When the baseball game was over other events took place in rapid succession, although some of the people made use of the dancing pavilion where the band rendered some excellent dance music. The garage owners carried away sixteen of the valuable prizes and the men from the Electric Vehicle Association carried off nineteen.

The tug of war was won by the Garage Owners (Electric Division) and the team consisted of the following men: Rudd, Sheldon, Benson, Salvat, Anderson and Nugent, each of whom received an individual prize.

Four prizes for the fifty yard dash for men were won by: Terry, Parker, Bennett, and Shaffner.

The three prizes for standing broad jump were awarded to: Mock, Benson and Lloyd.

The three prizes for the running broad jump for men were won by: Linton, LaVerne and Holland.

The three prizes for the swimming match were won by: Wells, Snow and Hicks.

Four prizes for four oar rowing match were won by: McPherson, Perkins, Putt and Cameron.

Three prizes for the fat men's running race were won by: Cohen, Veeder and Cameron.

The ladies' events were as follows:

No. 1. For ball throwing contest for distance, first prize, Miss Newbert; second, Mrs. Miner; third, Mrs. Rose Benfield.

No. 2. Twenty-five yard dash, the winners being: First, Miss Belle Beamer; second, Miss Dorothy Holtz; third, Mabel Daniels.

No. 3. Fifty yard dash, the two prizes being won by Clara Preibs and Helen Straus.

No. 4. The fourth event for the women was a nail driving contest, the prizes being awarded as follows: First, Mrs. Smith; second, Mrs. T. N. Kelly; third, Mrs. H. N. Fowler, and fourth, Mrs. Pearson.

All winners of prizes were given a number and the drawing was held just before leaving the grounds.

Chicago Section Electric Vehicle Association and Garage Owners' Association at Cedar Lake, Ind., August 8, 1913.

Considerable amusement was caused by some of the electric men winning prizes such as the Bowser oil tank, half barrel of engine oil, ignition battery, etc. An Edison storage battery man drew a Philadelphia Storage Company's ignition battery and an Exide battery man won one of his own batteries. A chauffeur from the Garage Owners' Association won a prize which was a one-half page advertisement in the *Traffic World*.

Dinner was served in the hotel dining room at seven o'clock and the automobiles left shortly after, the train leaving at eight o'clock. Everybody pronounced the day a great success, and judging from appearances, when this event is pulled off next year there will be at least 500 people present.

Detroit Car Finishes Record Run

New figures were established when a model 35, clear vision Detroit electric brougham made the run from the business center of Washington, D. C., to the heart of the business district of Baltimore, Md., and return, a distance of eighty-two miles, on one charge of the batteries.

The running time for the round trip was exactly seven hours flat. The start was made Friday morning at 7:40 o'clock from the salesroom of Emerson & Orme, local representatives for the Detroit electrics in Washington, at 1407 H street northwest. The big brougham was driven by R. Bruce Emerson, accompanied by Harry Ward of the *Times* and Howard S. Fisk of the *Star*, who acted as official observers on the run. Mr. Emerson was accompanied by one of the observers at all times. An Apperson touring car driven by Edgar Orme, containing motorists from Washington, followed in the wake of the record-breaking car. The run to Baltimore was made in three hours and ten minutes actual running time. The return trip was covered in three hours and fifty minutes. Reaching Baltimore shortly before noon, a stopover of two hours was made, after which the return trip was begun.

Detroit Electric on the Road from Washington to Baltimore.

The route from Washington was via Bladensburg, Hyattsville, Beltsville, Laurel, Elkridge, Relay and into the Monumental city via Wilkens avenue. The return trip was via Wilkens avenue to Relay, Elkridge, Laurel, Beltsville, Hyattsville and thence via Queens Chapel road to Brookland and on Rhode Island avenue. Although the road is in bad shape at Bladensburg, the electric slipped through and soon disappeared over the hills to Hyattsville, and was shortly on its way. The blockade was up on the return trip and for this reason a detour was made from Hyattsville to Brookland and thence into the city.

The machine was compelled to go through about twenty miles of freshly oiled and graveled road, several hundred yards of newly crushed metal near Baltimore, over the cobble-paved streets of Baltimore and finally through a mile of deep sand between Hyattsville and Brookland. The tar proved a drawback to the car, causing the tires to stick to the fresh oil, which pulled heavily on the batteries both going and coming. Then, again, a strong northwest wind blew throughout the day. At the conclusion of the run the batteries were in good shape, with an additional ten miles in reserve.

The machine was six months old and the odometer showed that it had been run 6,213 miles up to the start of the trip. It registered 6,295 miles at the finish at 7 o'clock Friday evening.

Tuesday, June 6, 1911, a Detroit electric one-ton delivery wagon, with a 1,200-pound load, made a run from the business district of Washington to the center of Baltimore and return, a distance of seventy-nine miles, on a single battery charge. On the run Friday lead batteries were used. The average of the round trip was 11.7 miles per hour. No trouble of any kind was experienced on the run, and the members of the firm have been the recipients of many congratulations.

The Electric for the Summer Home

Anywhere you may chance to go this year, you will probably find nearly everyone commenting on the number of electrics in use.

People who formerly regarded their electrics as being fitted solely for use in town are now including them as a necessary part of their country house equipment.

That this latest phase of the electric's usefulness is not a moment's fad but rather the result of a good, sound logical development which promises to flourish is the opinion of most automobile men. In fact, when asked whether he thought this new popularity of the electric would have any marked effect in increasing sales, Wm. C. Little, general sales manager of the Borland-Grannis Company, Chicago, manufacturers of the Borland electric, replied that no doubt it would, inasmuch as the people who were most likely purchasers were constantly within the influence of this evidence of the electric's convenience and all around utility.

"When I was in the east," said Mr. Little, "I was much impressed with the remarkable popularity of the electric at the country houses. In fact, I found this condition true throughout New England and at nearly all the Atlantic Coast summer places. And, since my connection with the Borland-Grannis Company, I find this equally true with respect to the suburban homes surrounding Chicago. Many of the well-to-do families of course own several cars, using the electric at their country places, however, for just the same purposes as they would in town."

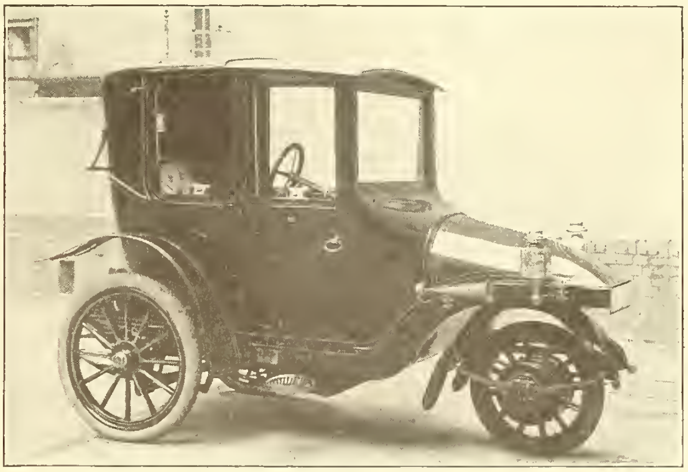
This season, indications are that the vogue of the electric in the suburbs and country places will become even more wide-spread than it has ever been before.

"The Borland-Grannis company does not believe in the yearly model idea," stated William Little, sales manager. "As fast as we develop something new, the minute it is proven that it will be an improvement it is added to our cars so that they are kept up to the minute all the time."

Tri-Wheel Electrics of Unusual Design

A Light Form of Car in Use in England and the Continent

BY S. D. METCALF



Three Wheel Coupe Model

IT IS noticeable that England, France and Germany do not hesitate to adopt models of automobile construction which would be regarded in this country as freakish. In the gas car line English practice has included several types of cyclecar, tricycle, etc., and, no doubt, such forms have some advantage for light work. It is interesting to observe that the usual more or less conventional lines of the electric have not hampered the activities of at least one manufacturer in this direction. The accompanying photographs show a line of three-wheel electrics now being made and marketed by Gebhardt & Harhorn, Berlin, Germany, whose London agent is the Torpedo Motor Company.

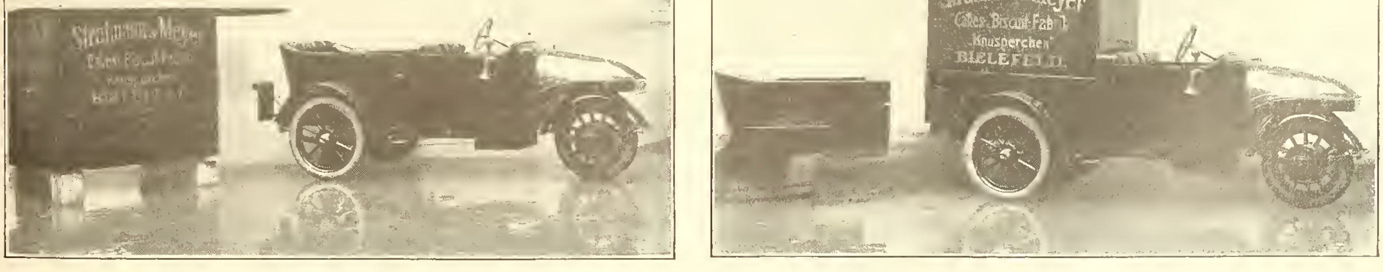
The illustrations showed several models of this type of vehicle, including a convertible four passenger car and delivery wagon, a torpedo roadster and a coupe—all of the three-wheel type. There is also illustrated a milk delivery wagon used by Marshall & Co.'s dairies, of Rupert street, Piccadilly, England.

This firm, encouraged by the success of a neighboring competitive dairy with this type of electric vehicle, has adopted three vehicles of the three-wheeled type, one having a capacity of 12 cwt., *i. e.*, carrying six 2 cwt. milk churns, and the other two having a capacity of 8 cwt., each carrying four 2 cwt. churns. It is estimated that these vehicles, which start at 5 a. m. and remain on the road until 6 p. m., do rounds of 20 miles per day, in charge of the usual men, who do not require any mechanical knowledge. The control of the car is of the simplest. Having in no way to adjust any mechanism, or even to use any oil, the driver is always able to attend personally to his customers, and to handle the milk—a point of some importance. In regard to hill climbing, Muswell Hill, a steep incline in the North London district, has been climbed with one of the larger vehicles carrying a load of 7 cwt. without difficulty.

The vehicles, while both of the three-wheel type, are of two distinct designs as regards the placing of the motor. The larger one has a motor rated normally at 3 horsepower contained in the hub of the front wheel; the two smaller vehicles are driven by a vertical shaft motor, rated at 1½ horsepower, placed centrally above the front wheel, to which the drive is transmitted by an enclosed countershaft. The chassis of these carriers are of pressed steel supported by semi-elliptic springs on rear axles of the fixed type, and in the front on a semi-circular vertical pressed steel frame, which forms the splash guard for the front wheel. Brakes of the external and internal band type are fitted on the same drum and are operated separately by hand lever and pedal. The steering is of the standard worm and sector type, adapted to the pivoted front wheel. The driver's seat is covered in, the partition at the back of the seat being utilized for cupboards in which to carry small dairy produce, such as eggs, butter, etc. The churns are carried on a float-type body.

The tires used are of two different types, which have both given great satisfaction, those on the rear wheels being the ordinary outer covers filled with a resilient compound known as "Rubberine," and the front driving wheels being fitted with K. T. tires of the air-cushion type in the form of 3 inch circular blocks of rubber placed at intervals around the wheel rims of the smaller car and 3½ inches on the larger. These latter are said to give a useful life of 12,000 miles, the life of the "Rubberine" being about 6,000 miles.

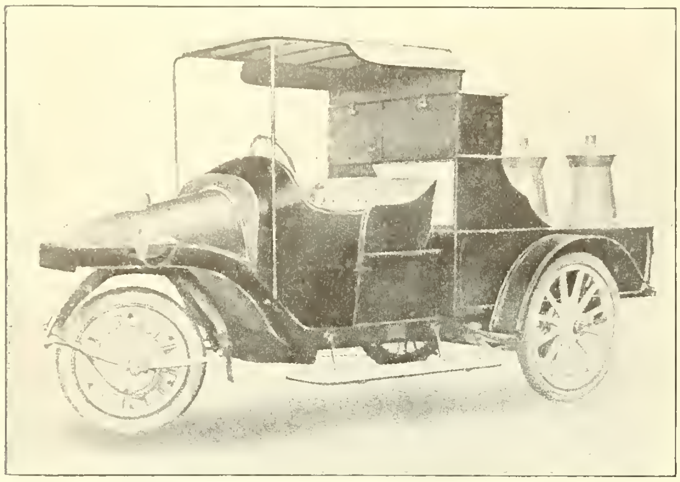
The accumulators used are of two types: "Tudor" cells and Hagen cells, of German manufacture. Both types are of 150 ampere-hour capacity, the numer of cells for the larger vehicle being 40 and for each of the smaller



Three Wheel Convertible Touring Car and Commercial Body, Showing Interchangeability.

ones 20. These batteries have both a maximum discharge rate of 115 amperes; they are housed beneath the driver's seat, occupying the space generally allocated in a gas car to the tank, ignition accumulators, foot pump, spare tubes, etc. The amount of space occupied by this portion of the equipment is small, a 12-unit output battery requiring less than 6½ cubic feet.

One of the great advantages of the electric type of vehicle over a gasoline vehicle for this business is the absence of fumes which would affect the taste of milk. In inspecting the batteries no trace of acid fumes was noticed. The mileage capacity of the 3 horsepower vehicle is 70 miles on a charge of about 16 units, the weight of the battery being 9 cwt., and the unladen weight of vehicle 19 cwt. in running order. The battery space occupied is 2 feet 7 inches by 1 foot 10 inches by 1 foot 4 inches deep. On the 1½ horsepower vehicles 50 miles can be run on a charge of 10 units, with a 20-cell battery, weighing 6 cwt. and occupying a space of 2 feet 6 inches by 1 foot 2 inches by 1 foot 4 inches deep; these cars unladen weigh 15 cwt.



Three Wheel Milk Truck Used in England.

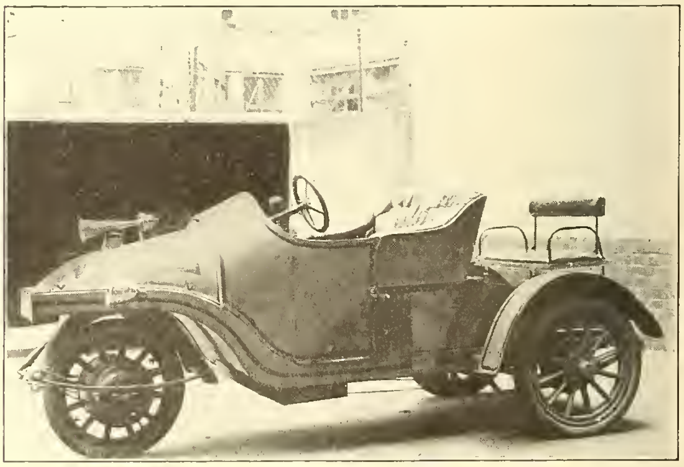
The pedal-type controller of the 3 horsepower motor has two notches giving a series parallel control of the battery in 40 and 80 volt grouping, the field windings of the motor remaining unchanged. The controller pedal is released on applying pressure to the brake pedal, and a reverse switch is fitted on the dashboard. The 1½ horsepower motors are provided with a two-notch lever controller and a three-step resistance pedal; a notch on the lever quadrant is also provided for reverse. The controller in this case gives a series-parallel control of the field coils of the two-pole motor. The application of each notch is followed by the cutting out of the stepped resistance by releasing a pedal, the control in this way closely resembling petrol-car driving with a gear lever and clutch. Both carriers are protected by a safety key that has to be inserted in the circuit before starting.

The motor wheel of the 3 horsepower car weighs about 2 cwt., and contains a six-pole series motor, the fields of which are formed by the hub of the cast-steel wheel. The armature revolves in the opposite direction to the wheel on a ball-bearing sleeve supported by the fixed axle, and is geared to the hub through intermediate raw-hide gear, with a ratio of 5 to 1. The current is taken to the commutator and to the fields by means of separate sets of slip rings and solid phosphor-bronze brushes on either side of the wheel.

The motors of the 1½ horsepower cars are of the two-pole series type and are placed upright on the steering center of the front wheel, a vertical enclosed countershaft transmitting the drive by means of pinions and bevel gear to the front wheel axle, the gear reduction being 13 to 1 and the diameter of wheel 28 inches.

The plant for charging the batteries is very simple. In an annex to the dairy premises of no more than 12 by 14 feet floor space is installed a 2 foot square charging panel fitted with main switch, safety cut-out, two fuses and plugs for one positive and one negative lead; also the necessary ammeter and voltmeter. Immediately beneath the panel is a regulating resistance for varying the current from zero to 35 amperes. The vehicles are charged in series and the resistance adjusted according to whether one, two or three vehicles are being charged at a time. On each battery two lugs with tapered plug holes are provided for the reception of the main or the intermediate leads. The 1½ horsepower carriers are charged every evening for about three hours, and the 3 horsepower for the same time every other evening. The practice is for the roundsmen to connect up when the cars are brought in at 6 p. m., an operation requiring about five minutes; the manager, who lives on the premises, switches off at about 8 p. m. The charging current is started at 30 amperes, and within two hours falls gradually to 10 amperes. Current is supplied by the St. James & Pall Mall Electric Light Company, and is charged for at the rate of 7s. 6d. ($1.85) per horsepower per annum and 1d. (2 cents) per unit.

Figures obtained by another dairy running three of these vehicles showed the consumption of electrical energy for a week to be 151 units for a total car-mileage of 462 miles, which works out at under 1/3 unit per mile, with totally inexperienced drivers. These results are considered to be capable of much improvement. In traffic, slow running with a full load can be effected with the 3 horsepower car on about 15 amperes at 40 volts, giving 6 miles per hour. From the experience gained up to the present by the Torpedo Electric Vehicle Company, the positive plates of the accumulators should not require renewal for about 10,000 miles, the deposit being removed about every 3,000 miles.



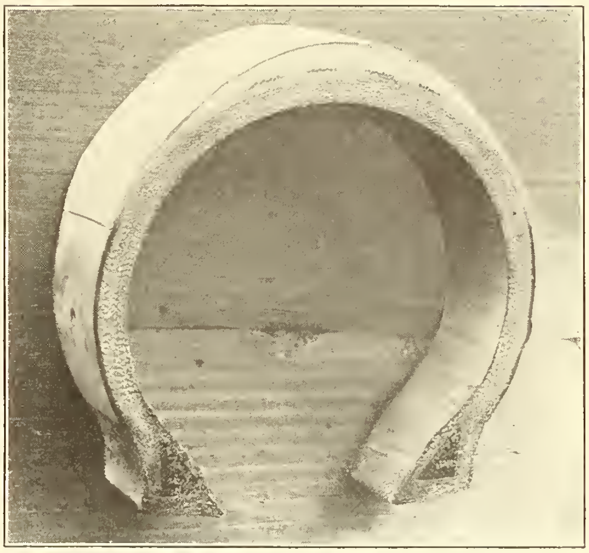
Three Wheel Torpedo Roadster.

Out of hundreds of Borland Grannis electrics in daily use in Chicago, according to William Little, sales manager, there has never been a case known of a broken Borland propeller shaft or a broken Borland driving shaft.

Special Features of Tires for Electrics

Some Recent Developments of this Branch of the Industry

BY HARVEY GREAVES



Cross Section of Goodyear Plain Tread Electric Tire.

Cross Section of Goodyear Non-Skid Electric Tire.

THROUGHOUT the electric vehicle field manufacturers are advocating the standardization of tires on the basis of tractive effort and ton-mileage. The tire is a problem to manufacturers, due to the fact that scientific research has not been carried out sufficiently to standardize a product securing a long life and a construction flexible enough to give a low energy consumption. Every manufacturer puts forth a tire having some special feature which increases the mileage, and which does not absorb so much energy. Resultingly, we have a great many special features, some of which are adequate under certain conditions while inadequate under others.

Conditions apply both as to the nature of the road over which the tire must travel, and to the construction of the tire; that is, solid or pneumatic.

Much discussion arises relative to this first condition, the nature of the road. Day Baker of the General Vehicle Company, at a recent meeting of the New England Section of the Electric Vehicle Association, pointed out the adequacy of the dual 5-inch tires on 5-ton electric trucks for ordinary use on hard, level roads. On hilly roads he conceded that larger tires would be advisable. The increasing size of the tire adds to its purchase price, no doubt gives it a greater life, but absorbs more energy. Consequently we have room for discussion whether the increased investment, required in using larger tires, is compensated by the resulting gain in durability and resulting length of life.

As to the condition relative to the construction, solid or pneumatic, the opinions of the manufacturers, the vehicle manufacturer, and the purchaser widely differ, both as to the energy absorbed and resiliency produced.

The pneumatic tires are constructed of the purest Para rubber. By a special process of construction, the cotton is woven with a large mesh, permitting the use of a greater amount of rubber between the layers of fabric. This gives a greater resiliency, and makes the tread much thicker and a great deal longer wearing.

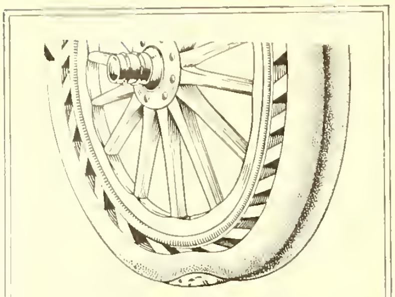
The higher the quality of the material used in the tires, the greater the consequent resiliency, the less energy consumption and the greater mileage. A great many manufacturers do not approve of the pneumatic on account of tire troubles such as punctures and blow-outs which are unavoidable and may happen at any time.

The solid tire, used exclusively by a great many companies, has proved very popular, both from the vehicle manufacturers' standpoint and that of the consumer. The Motz Tire and Rubber Company, of Akron, Ohio, one of the best known manufacturers of the solid rubber tire, has devoted the past seven years to perfecting a solid rubber tire that would meet the most exacting demands of the electric passenger car industry. In the first place, the company claims that the price, or initial cost, has been the main consideration in determining tire equipment. However, this is proving a fallacy, at least to those who have kept an acurate account of expenditures which can be traced directly to trouble from tires, or caused by the continual shock occasioned by the use of solid tires of poor construction.

The Motz "high efficiency" cushion tire is constructed with a dual or split tread, distributing the traction through two points of contact at the same time. These treads are undercut on the sides, and the recess is divided into equal parts by supports or sections of rubber. These supports are so placed at an angle that when the weight of the car is exerted on the tire, the treads have a tendency to spread, thus throwing the load on these supports. And as the pressure on the tire is applied in one way only, the natural action of driving or forcing the car forward causes the stretching effect desired.

The commercial car tire, patterned after that of the passenger car, is a much wider tire, the recess, however, remaining the same as in the smaller tire, furnishing, with the great weight of the body on the rubber braces, sufficient resiliency to protect the mechanical parts of the car and to give enough traction to transmit the power from the motor.

The Goodyear Tire and Rubber Company has introduced a new pneumatic tire with a special feature, a light blue layer of rubber that extends around the tire and lies just above the breaker strip. This shows



Resilient Action of Motz Tire.

up in the photograph as a dark line. It is for the purpose of warning the user to have the tire retreated immediately upon its wearing down to where this blue layer of rubber is exposed. This feature is of special interest in that the consumer, unacquainted with the technical construction of the tire, can readily determine when the retreading is worn off, thereby saving the fabric and the unnecessary expense of a new casing.

The tire industry needs the co-operation of the consumer, in order to insure service. Many concerns guarantee a tire for a certain mileage. In many cases fulfillment of the guarantee would be impossible, yet in other cases this guarantee could be fulfilled satisfactorily if the consumer had not neglected his tire. The tire used for electric vehicles is very refined in construction and should therefore be treated with some consideration, in order to insure the greatest possible protection from troubles.

Steel Bodies for Motor Trucks

Among the things that the motor truck has inherited from the horse-drawn wagon builders is the wooden body. But repeated experience has shown that this material does not last as it should under the changed circumstances; the heavier loads, the greater speeds, the longer working hours, combine to make the body suffer greater stresses, and wood, under them, goes to pieces rapidly, says Morris A. Hall in the *Scientific American*. This situation has brought about a demand for metal bodies. The first of these, and many built since and being built today, are not an unqualified success. The reason for this lies in the fact that they are put together with bolts or rivets, which do not withstand the stresses imposed by truck work a great deal better than bolts or screws on the wooden form.

More recently, a process has been developed for producing steel bodies, which includes the use of various successful welding processes in combination with the highly-developed pressed steel as a material. The latter is much lighter than ordinary rolled sheets of equal strength, while the welding processes unite the members as firmly as the component parts of each sheet. The result is a lighter, stronger, longer lived body of lower first cost when built in quantity, lowered maintenance cost due to lessened depreciation and less tire wear resulting from lowered weight.

Truck manufacturers recently have agreed upon standard body and total weights for given load capacities, basing their figures upon wood bodies. Now, if steel be used a saving results which may be taken advantage of in one of two ways; the load may be kept the same and the lessened tire and other wear taken advantage of, or the load may be increased by the amount saved on the body weight. When 400 pounds can be saved on a 5-ton truck body standard weight for which is but 1,400, this much may be added to the usual 5-ton load amounting to 4 per cent. On heavier vehicles, where the body weight in wood runs up more rapidly, the saving is much greater, running above 5 per cent of the load.

It is said the wear of rubber tires varies as the square of the load, the speed remaining constant. On this basis a 5 per cent saving in body weight would be about 10 per cent saving in tires. The usual mileage guarantee being 8,000 miles, this means the addition of 800.

The exact life of the steel body is not known, but may be inferred in this manner: A Brooklyn builder following the wagon method of riveting and bolting steel plates and structural forms together, has many in use which have seen 14 years' hard service in New York city, hauling coal, than which nothing is more severe. They seem good for some years' use now, and granting that welded pressed-steel bodies are twice as good, the latter should give over 30 years' service. The life of an ordinary wood body does not average much over 6 to 8 years, although there are exceptional cases in which they have lasted, through light work, twice as long.

An advantage in favor of wood at first was the matter of painting; it was extremely difficult to get paint to stick to steel sheets, the result being that they had to be painted often to prevent rusting and the quick destruction of the body in that manner. In the welded pressed-steel forms mentioned the bodies are enameled, and the enamel is baked on, so that it is as hard as porcelain and cannot be chipped off even with a hammer.

The nature of the materials used in the trade which employs the truck has a huge influence. Take the brewery delivery service for instance; the kegs have iron chimes or bands which rust down to a very thin edge. Thus they have a cutting property. They are put in and taken off the wagon rapidly. As a result the rungs, posts, rails and other parts of the body are quickly cut up, and soon require repairing. So great is the need for this that the largest brewers, such as Ehret, Ruppert, Ringling, Central, Lion, and others of New York city, maintain a large and well appointed repair shop which does nothing but repair the bodies. With the motor truck, time spent in the repair shop is a double loss, so this question is of double importance.

The newer forms of steel body would eliminate all this, while the hollow shapes used in the body construction would give greater resistance to sudden blows. The same is true of other firms; the coal body must withstand the water used in wetting the coal as well as the constant erosion of the material sliding in or out. Metal alone will do this, consequently, if wood be used, the body must be steel lined. The same is true for sand and gravel, cinders, broken stone, brick or any similar material. For hospital use, especially in handling patients with contagious diseases, it is important that the body may be rapidly and readily cleaned out and fumigated With wood this is an extremely difficult job. For tank or other liquid carrying bodies, wood has been abandoned, practically, steel taking its place.

And so it would be possible to go through the whole range of uses to which a motor vehicle might be put and prove that for each and every one the steel body has some advantage over wood, sufficiently weighty to warrant its use in preference to the latter.

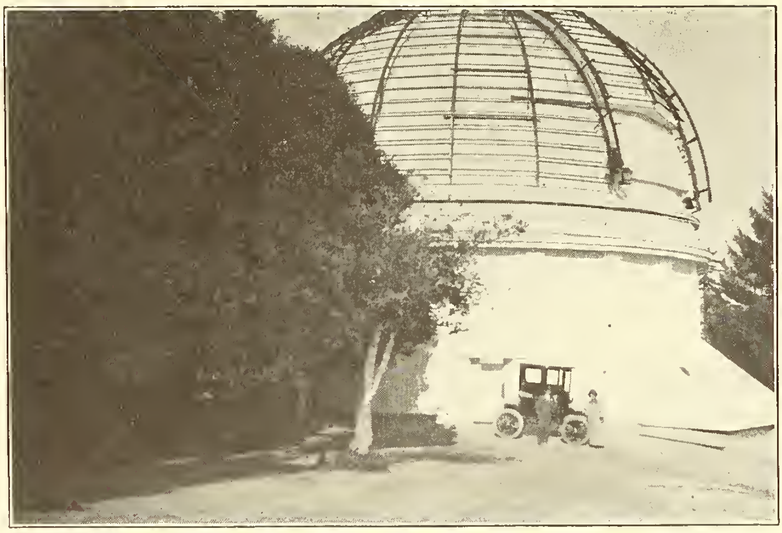
The ventilation of the battery tray is of the greatest importance, for the accumulated acid fumes destroy the wiring and exposed metal parts, and also tend to introduce impurities into the electrolyte.

Scaling Mount Wilson in an Electric

Hill Climbing Feat Performed in a Columbus Coupe

BY L. EDHOLM

WHAT is generally regarded as a feat for the driver and a proof of the excellence of a high power gasoline car is the ascent of Mt. Wilson, near Los Angeles, California. Yet this nine-mile road, with its grades running from ten to eighteen per cent, has been conquered by the electric car, the type of pleasure vehicle that is so largely used by ladies in shopping trips about town. This remarkable test is declared to be the most severe to which any electric car has been put, and it opens up a new field of action for the little coupe which has heretofore been regarded as useful only on the best roads and easiest grades.



Under the Dome of the Observatory, Mt. Wilson, California.

No especially equipped car was selected for the purpose, as it was planned to see just what an average electric would do. The day selected was ideal, even for southern California, and the trip was begun about nine o'clock in the morning. The run from the garage to the foot of the mountain was made in an hour, a distance of 22 miles. From the foot of the mountain one is required to telephone before beginning the ascent, as the road is too narrow for vehicles to pass except at certain points which are arranged in advance in case other cars are descending. The turns are exceedingly sharp, and motors with long wheel base are forced to stop and back and start again to make them, but the small electric coupe had no such difficulty. In fact, it carried its load of two passengers without the slightest difficulty over the long eighteen per cent grades and when tested it was found to be only slightly warm, not at any time dangerously heated.

The Road Was Steep and Narrow, But the Little Electric Took It Easily.

Traveling on the fifth speed, there was a variation of from 75 to 150 amperes, but an average of 125 amperes was maintained. Near the end of the nine-mile steady climb, it was found to be pulling 75 amperes at 56 volts. The summit, 5,897 feet in altitude, was reached about noon, and after testing the batteries for heating with the satisfactory result of only 95 degrees fahrenheit, a little spin was taken about the plateau on the summit. This peak is famous as being the site of the Solar Observatory, and a good road leads among the dormitories, observatory buildings, solar tower and cottages maintained by a hotel company. All these buildings form quite a little settlement far above the surrounding country.

After dinner the descent was begun and the car was kept under quite as perfect control on the down grade as on the climb. From the foot of the mountain the return to Los Angeles, an additional 22 miles, was undertaken, all without having made any repairs or recharged the batteries. The car used for the test was a Columbus coupe.

The three arguments used by the gas car enthusiasts against the electric are low speed, limited mileage and poor hill-climbing ability. It is now becoming generally known, even among laymen, that many electrics are made whose speed capacity is greater than any legal allowance. It is becoming no uncommon feat to cover eighty to one hundred miles on one charge in an electric—as much as the average driver cares to accomplish in one day. And a few tests like the trip up Mt. Wilson will show that for hill climbing the electric has no superior.

Couldn't Stop an Electric!

Associated Press dispatches from Huntington, Ind., tell a weird story of a runaway electric which could not be stopped, and whose passengers simply rode and rode until the battery was exhausted—a sort of Flying Dutchman of a car. It is impossible to conceive of anyone intelligent enough to steer a car being unable to shut off its power, even if they had to break a wire; but be that as it may, we cannot resist the temptation to publish the following Walt Masonism on the subject from the Chicago *Daily News:*

WOMEN EMBARK; AUTO ON LARK

You've heard of Gilpin—first name John—and also Paul Revere. The tale of bold Mazeppa, too, has doubtless passed your ear. Now, hearken to a modern tale, wherein two Hoosier dames outdid those famous rides, and so immortalized their names. No horse they rode; an auto was their means of locomotion. They drove for pleasure just because they had the pleasant notion. In an electric runabout Miss Mary and her mother (their name was Caswell, by the way) went riding with each other.

Alack, when they had driven far and both were tired of riding, they aimed for home and tried to stop upon the family siding. Then fell the blow—the mad machine refused to cease pulsating, and sped right past the dear demesne without once hesitating. The ladies fought and thought and wrought, but all in vain their labors; undaunted sped the runabout away from home and neighbors. Up "this here" street and "that there" place it sprinted like a racer. Though still the women tugged and strained, the problem was a "facer."

At last a happy thought was theirs. They sought the city's limit, then hunted up a nice, high hill and dared the car to skim it. The brakes were on, the speed was low; Miss Mary plied the lever. Her mother hopped out gracefully and seized a phone receiver. Bold Caswell, when he heard the news, made haste to reach his daughter. When Mary reached the hill again, he made a sprint and caught her. He took the wheel, but all in vain his efforts were to stop her, and Mary for an hour or two went riding with her "popper."

They drove until the battery exhausted all its "inner," away out near the suburb line, some miles from home and dinner. Then Mary and her father walked a mile or two together, and rumor has it that they did not talk about the weather.

Lansden Company Affairs

The Lansden Company of Newark, N. J., and Allentown, Pa., manufacturer of electrical vehicles, filed a schedule in the Bankruptcy Court in Newark on August 8, showing claims amounting to about $193,000, held by 300 or more creditors, and assets of $304,046. Of the latter item a very large proportion is represented by manufactured product at the two above-named plants, totaling in value $118,178. The assets include also $32,516 in bills receivable. The company consented to an immediate adjudication of the claims presented upon the filing of the bankruptcy petition by the Crescent Auto Company, of New York. The largest creditors are the Merchants' National Bank of Jersey City, which has a claim of $30,428, partly secured; the Edison Storage Battery Company and the General Electric Company, whose combined claims total about $30,000, and the North Ward National Bank, whose claim of $12,500 is unsecured. The company was organized in 1904 by Thomas A. Edison, and in January, 1912, control of it passed into the hands of W. L. Case and interests represented by him.

The capital was increased from $100,000 to $1,000,000, and a new factory was leased in Newark. In June of the present year the company acquired the plants of the Webb and the Mack Brothers companies at Allentown, Pa., and established a branch at that place, moving to it part of the equipment of the Newark plant. George Paddock, of the Paddock-Zuzi Motor Company, is the receiver.

Pelletier Buys Big Electric Car Plant

Word comes from Detroit to the effect that E. Le Roy Pelletier has purchased the Flanders electric plant, equipment and stock on hand, and will organize a company to continue the manufacture of this popular electric car.

The Flanders electric was involved in the Flanders Manufacturing company, which concern resulted from the unifying of several concerns, each making a different model. The car is to be called the Tiffany electric.

Associated with Mr. Pelletier is Don C. McCord, former manager of the company and who will also manage the new concern.

"Our plans," says Mr. Pelletier, "are, in brief, as follows: We will organize a company in which only men I know and who know the business—its hazards as well as its opportunities—will be allowed to participate. We are planning conservatively as befits an electric car business. Less spectacular than the gasoline car business, it is also safer. In fact, there is no chance for the newcomer in the gasoline car field today. The electric, on the other hand, is all in the future. It has grown steadily and surely. I believe in its future most profoundly. In fact, no one can tell where it may yet go.

"We will continue to make the Flanders car—for the present—just as it is, for the very good reason that we do not know where nor how to improve on this splendid model. The low, long colonial body set a new fashion in design and a faster pace in efficiency when it came out. So we will leave well enough alone, for the present at least.

"The name will, however, be changed, for while I have purchased the 'good will' and therefore the name of the old car, I do not think it fair to Mr. Flanders to use his name when he is no longer connected with the concern.

"The new car will be called the Tiffany electric and will be made into two models—the present model, which we will hereafter designate the Tiffany 'Mignon,' and a larger, more expensive car (in the $2,000 class), which will be known as the Tiffany 'De Luxe.'

"The two models will be of similar design, adhering closely to that of the present model, which made such a hit, and will differ only in size and richness of appointments. It is my ambition to design and build an electric that will justify the superlatives the advertising man so loves to use.

"To the six hundred and odd owners of Flanders electrics I want to say the new concern assumes gladly the guarantee given by the old Flanders company, and will continue to make and furnish all replacement parts. The best ad I ever wrote was that announcing the Flanders electric. It was a good ad because it rang true, and its quality was due to my profound belief in the car, in the design of which I had a hand. That I still believe in it just as fervently is shown by the fact that I outdid all others for the purchase of the property."

By becoming owner of an automobile factory Mr. Pelletier does not sever his connection with the Maxwell Motor Company. He will continue to act in the capacity of advertising counsel for the $37,000,000 concern, of which his old-time chief, Flanders is president and general manager, and, aside from directing the sales and advertising policy of the Tiffany Electric Car Company, will leave all responsibility to Don C. McCord, general manager of the new concern.

Electrics for the English Market

London Electrician's Correspondent Analyzes the Situation

BY J. W. BEAUCHAMP

WITHIN the present year England's attention has again been directed to the self-contained electric vehicle. The use of stored electricity as a means of propulsion for road vehicles is one of its very earliest applications, and possibly in no other direction had the efforts of electrical engineers met until recently with such disappointing results. The solution of the problem, simple in every respect excepting that of carrying the supply of electrical energy, has received a fresh impetus from the improvement of the storage battery, which has been so perfected in detail and construction that it offers to the engineering world a practical means of carrying and retaining electricity apart from its source of production, a facility which will appeal to workers in many fields of science and engineering.

Although the storage battery is used to a considerable extent in connection with public electricity supply, there is so far but little information available with regard to the effect on the supply business which might result if large numbers of batteries were in the possession of private individuals, and such information as is to hand is mostly derived from American practice and through sources which are interested in the exploitation of the electric vehicle.

The ordinary consumer of electric power is stationary with regard to the local supply undertaking, drawing his energy from a point on the main system convenient to himself and at times of the day which suit the needs of his business; but the possessor of electric vehicles is a mobile consumer of energy, able within limits to draw his supply from points convenient to the supplier, and even to desert him in favor of another within reasonable distance. His convenience may, in many cases, be met by taking charging supplies during those hours when his vehicles are not needed, that is to say, in most cases at the time when the demand upon the supplier is not heavy.

Ten Year Old Waverley in England.

The American buyer usually thinks when he purchases an automobile that his first investment will be a permanent one and that the car he purchases this year will serve him for many years. About the end of the first year the car will need repainting and will look rather shabby as compared with the newer type cars that his neighbors are buying and he will begin to feel some doubt as to the permanency of his investment.

By the end of the second year he is ready to trade in his old car for a new model and in this way the yearly model idea has become established in this country so that fashions change in automobiles almost as rapidly as in clothing.

It is not so abroad. The accompanying picture shows a Waverley electric owned by Nicholas Kilvert, Brooklands, Cheshire, England, which has been used almost daily, six days per week for ten years for station work and social purposes on country roads in Cheshire, being driven almost exclusively by the owner's daughters.

The factory number of the car is 1150 and it was purchased in June, 1903. No record was kept of its mileage or its running cost, for its owner states that these have been very trifling, the renewal of battery and tires being the chief items.

The charging power has been obtained from a plant at the owner's residence and it was stated that five pounds per annum would cover this item. Fire insurance only has been covered as other risks have been considered too slight to justify any protection.

The owner of the car is a director in the Lancashire Dynamo & Motor Company, Manchester, England, and has been so well satisfied with the service that he received from this old type Waverley that he placed an order the other day for a Model 98 Silent Waverley.

These features of the business in view give the consumer a certain independence of the supplier, and although at the same time they put the latter in a good position for dealing with such requirements, they demand some forethought and attention if the fullest advantage is to be obtained.

It may be of interest to examine the position of the vehicle business today and consider the information available from the point of view of the British supply engineer who is seeking further activities for his plant.

The number of electric vehicles in use in England today is not large, but it is by no means so insignificant as is generally supposed. Cabs are in daily use in London, while it is stated that a considerable fleet of electric taxis is now being prepared. The silent and rapid electric ambulance is an all too familiar sight in the city and the dock area of East London. Several of the large West End stores, after trial of the Edison vans, have now ordered considerable numbers, and at least one continental firm is having success amongst tradesmen with a light cart driven by lead batteries, and a particularly ingenious arrangement of the driving motor on the front axle.

On the continent the lead battery appears to have made quite a permanent position for itself in connection with a certain class of road transit. Complete fire brigade equipments, tower wagons and light postal vans are used in considerable numbers, while one company has produced and sold large numbers of powerful tractors for municipal service. These machines are arranged for the ready attachment of dust vans, slop tanks, street sweepers, and watering carts, or may be used for carting material or for any service where heavy loads are to be transported at slow speeds.

In the States it would appear that light cars of the runabout class have been successful, while vans for heavy work, dock traffic and general store deliveries have become very numerous, the total number in use being stated at about 40,000.

In undertaking publicity work with the object of encouraging the use of the electric vehicle and obtaining the business of battery charging, very careful attention must be given to the commercial aspect of the proposition from the user's standpoint under British conditions. A false move in this direction may do much harm, and where the work is put into the hands of a general light and power selling staff, precise limits and instructions should be given and adhered to, and embellishments of facts discouraged. Attention must be concentrated on the class of business which a study of the electric vehicle problem shows to be possible with gain to the user.

In comparison with horse and other methods of mechanical transport, the first cost of the electric is high, but its running cost is low. Therefore, commercial success depends upon obtaining the utmost possible ton-mileage out of the new vehicle. In many cases one of the advantages which it offers to the user is the incentive to overhaul his organization and system of goods delivery, a selling point which must not be lost sight of.

In certain businesses cartage work consists principally of carrying heavy loads for considerable distances with few stops, as in delivering furniture, pianos, etc. In such cases it is possible to obtain a big day mileage.

In a large business by careful arrangement a van may be worked with two shifts of men, so avoiding to a great extent the cost of keeping it standing while the men attached to it take meals.

In other classes of work the opposite conditions obtain. Vans are used to deliver small weights at frequent intervals, covering but a short distance with many halts, as in the business of retailing bread, milk, and other foodstuffs.

At present many large undertakings have a system of "distributer" carts going from house to house, and replenished at intervals by "feeder" carts from headquarters. In such a case the use of an electric for the distributing duty might be more expensive than the present system, but employed to feed a number of horse carts it might achieve great economies.

Speaking generally, attention should at first be concentrated on business which calls for the transport of heavy loads at moderate speeds.

For city work the moderate speed of the electric van, coupled with its rapid acceleration and ease of control, is a positive advantage over the higher speed of petrol and steam vehicles, which are only able to maintain a fair average rate in dense traffic by a succession of stops and spurts, destructive alike to the machine and the road. In putting forward the commercial electric van proposition it is necessary to present clearly the salient advantages of this method of road transport, some of the principal of which are enumerated below. Others will be met with from time to time in the course of business and should be carefully recorded.

1. Extreme simplicity and reliability of the motor and controlling apparatus in which there are no reciprocating parts and no mechanical gearing for regulating speeds or reversing.

The electric motor has already replaced to a very considerable extent the use of various kinds of engines for driving machinery in factories; this is largely due to the simplicity of the rotary machine as compared with any reciprocating apparatus in which wear and tear, consumption of lubricants, and risk of breakdown are immensely greater.

All these merits of the tried and tested electric motor are now available for mechanical road transport and they show up most advantageously in comparison with steam and petrol engines, which suffer far more when used for driving vehicles than when stationary, owing to the roughness of roads and vibration.

2. The control of an electric vehicle is of the simplest description, and is furnished by one lever or pedal combined with a steering wheel.

It is unnecessary to dismount in order to perform risky gymnastic feats with the starting handle, as in the majority of petrol cars.

Speed variation and reversal are obtained without clutches or gearing.

Starting and stopping and speed change are smooth and silent.

There is no emission of smoke, cinders or odor, and no back firing or adjustment of fuel or air supply.

Driving becomes merely a matter of steering, and any person can operate an electric vehicle after a simple demonstration.

The efficiency and welfare of the machine are practically independent of the skill and knowledge of the driver.

The driver of an electric business cart is able to keep himself sufficiently clean to handle goods and book private house orders.

3. The speed of the electric vehicle is limited by its design, and it becomes impossible to exceed a certain predetermined rate even when the van is unloaded, so removing the drawback peculiar to most mechanically-driven vehicles that they may be raced under certain conditions. Records have proved that increase in the speed of a mechanical vehicle beyond its proper limit causes the cost of operating and maintenance to rise out of all proportion to the extra duty obtained. This is particularly the case when the vehicles are lightly loaded, and one of the chief points in favor of the electric van is that it cannot be raced when empty, a proceeding which is most destructive to the ordinary steam and petrol van.

4. Absence of the use of inflammable spirit.

The vehicles are driven and lighted by electricity.

The cost and risk of handling and storing petrol or other fuels and making acetylene are entirely eliminated, and the expense of insurance is reduced.

5. Great reduction in fire risk when on the road and when in garage.

6. The vehicles do not drop liquids on the road. Owing to the simplicity of the moving parts, lubricating is reduced to a minimum, and the oil and grease nuisance, characteristic of most mechanical transport methods, is absent. The waste of petrol and oils has an injurious effect upon the roads, and gives rise to danger

of explosion in drains and sewers, while extra cost for cleaning is involved and damage done to the rubber of tires, insulated wires, and other parts of the vehicles.

7. Silence in operation is the most striking feature of the electric vehicle, owing to the simple turning movement and the absence of all reciprocating parts, explosions, and changing of mechanical gears. These vehicles, whether in the form of pleasure cars or heavy vans, are absolutely silent, an advantage for which perhaps few are prepared to pay, but one which in the aggregate appeals to everyone very much.

A preponderance of the electric-driven vehicle on our city roads would effect a great reduction in the nerve destroying clatter, which is a feature of them today.

A certain type of light electric car has already been put into use for the delivery of milk in residential districts in the early morning. Its silence in operation is one of its chief recommendations, contrasting in a striking manner with the clatter and jingle which are associated with morning deliveries by the horse-drawn cart.

The electric car can be turned in an extremely small radius, in some cases little greater than its own length; a feature which gives it an advantage in manipulating heavy loads in railway yards, markets, and other congested areas.

8. Guarantees can be obtained from most battery makers. The Edison Storage Battery Company offers the following terms:

> Any defect in workmanship or material will be corrected free of charge if notice be given within one year of delivery.
>
> If, during six years (or four for traction service) from date of delivery, any cells are found to be incapable of developing full-rated capacity, under normal conditions, we will, at our discretion, either replace them with other cells of full-rated capacity, or repair such cells to restore their full-rated capacity, free of charge, f. o. b. our works, provided that all said cells are installed in a manner approved by us, and that all said cells are cared for and operated in accordance with our standard printed instructions.

Most of the leading makers of lead cells for traction service are also prepared to quote inclusive terms for maintenance based on mileage.

9. Increased useful life of tires. Owing to the simple rotary motion of the electric motor, and the total absence of pounding on the tires, and less slip at starting, it is found in practice that the life of the tires is considerably greater on an electric vehicle than in the case of petrol or steam.

10. The cost of electrical energy at current rates for running these cars and vans varies from one-third to one-half of the cost of the petrol required for motor vehicles of the same carrying capacity.

The cost of coal and petrol has risen rapidly within recent years. In the latter case the price appears to be subject to variations out of all proportion to its cost of production, whereas the cost of electrical energy, although to some extent dependent upon the cost of fuel, shows a steady tendency to fall owing to the rapidly increasing demand which enables suppliers to employ larger and relatively less expensive and more efficient machinery for its production.

11. The operation of the van is independent of weather and climate, while its extremely powerful starting effort makes it most useful in temporary road difficulties, such as soft ground, snow, etc.

The electric wagon can be garaged where horses would not be permitted for sanitary reasons, or on account of the noise which is associated with stables.

12. In putting forward the claims of the electric pleasure car, the seller is often met with the objection that its maximum economical speed is inferior to that of the petrol car.

This, at the present time, is true, but it is not so serious an objection as is generally imagined.

In the case of heavy street traffic, owing to certain features of the electric car, its average speed through the working day more nearly approaches its maximum than is the case with the petrol machine.

Moreover, in practice a powerful touring car can seldom be used at its top speed for sufficient length of time to constitute any real advantage to the owner. Powerful cars are rather expensive toys, from which occasionally the owner is able to obtain the luxury of excessive speed for a short time.

In putting forward the small electric for business and city work, one of its most promising fields, it is desirable to point out that at the present time owners of large petrol cars use them to a considerable extent for short runs in connection with their business. This is most uneconomical, the petrol consumption, wear and tear of machine and tires being out of all proportion to the benefit gained on these short runs, while the massive car helps to add unnecessarily to the congestion of the thoroughfares.

In many cases a business man would find it an economical proposition to reserve his petrol car for distance and pleasure work, and maintain, at the same time, a small and convenient electric runabout for business purposes and evening work in the city.

The spectacle of one man driving himself about the narrow streets of our business districts in a car capable of carrying five or six people along the road at 40 miles an hour, is not infrequently seen, and certainly does more to add to the cost of motoring than the owner generally imagines.

Tar Bonded Roads in Cincinnati

Cincinnati is the scene of a number of important successful road contracts where the macadam has been rendered automobile-proof by the use of a refined tar binder. This was one reason why the American Road Makers' Convention was held there in 1912.

Madison Road, the sole eastern thoroughfare in the city, affords the oldest instance of tar bonding. It carries a traffic so heavy that a contractor who took a traffic record, reported that macadam could not be used at all.

In 1907 the north side of this road was resurfaced with tar bonded macadam to afford a comparison with native rock asphalt and plain macadam. Within a year the tar bonded section had so clearly demonstrated its superiority that the property owners petitioned for more of it, and in 1908 the remainder of the road was accordinly reconstructed with the tar. Since then the road has been uniformly in excellent condition and has cost nothing for maintenance except a little patching and a partial treatment with a surface coat of a thin grade of tar.

Erie avenue was bonded with tar in 1908 and required no attention until 1912, when several holes were repaired and the surface was given a renewal treatment with tar. Before the use of tar binder, this avenue had required resurfacing every six months.

Observatory Road, another important thoroughfare, had been impossible to maintain in even reasonably good condition previous to the use of a tar binder in 1909. Since then it has been in excellent condition and required no attention until it received a surface treatment in 1912.

Grandin Road, another heavy traffic street, had required resurfacing twice a year until in 1907, when it was bonded with tar. After that one surface treatment with tar was enough to keep it in good shape.

The tenacity of the tar bond was interestingly illustrated on Hillside avenue in 1912. On a steep hillside section there was a landslide which shifted the foundation of the road. The tarred surface, however, instead of breaking, stretched and twisted very much as if it were a big sheet of rubber.

In 1911 Cincinnati abandoned the use of plain macadam on all main thoroughfares and substituted the tar bonded type of construction.

The Commercial Electric

"The solution of what appears to be one of the largest problems to overcome by the men who are working out the marvelous merchandising systems of American cities seems to lie in the development of the electric commercial vehicle," says J. M. Lansden, second vice-president of General Motors Truck Company of Detroit, Mich.

"Although electric commercial vehicles have been used for almost two decades, it was not until a half dozen years or so ago that they began to take an important place in our present-day scheme of haulage and delivery. Today the electric truck is making the most extraordinary advances in its field—city and suburban use.

"Last year the number of electric commercial cars used in some of our metropolitan cities increased considerably over 50 per cent. And a most significant fact is that a large percentage of the machines were sold on reorders. The development of the retail trade in the larger American cities during the past decade has been a commercial wonder to the rest of the world. And it had no experience to go on—no precedent to follow. Improved merchandising methods brought a sudden and enormous increase of sales in all sorts of lines.

"Department stores have had a big place in changing conditions, but every retail and mercantile concern has been affected. The concentration of industries has been another factor in increasing the use of electric trucks.

"Food, milk and produce supplies have been centered in the cities, and all this tended to multiply the necessity of adequate and efficient transportation methods. The manufacturer of supplies—as he may be called—the baker, the brewer, florist, soft drink maker—and the middleman, like the wholesale meat or provision dealer—have come to the same relation to their customers (the grocer, the drug store and the butcher shop) that the dealer has always occupied toward his customers. Meanwhile, the buying public has demanded that its supplies be fresher than in less discriminating days, as well as greater in variety and better in quality.

"So the wholesaler has had a new delivery problem to meet, and, like the retailer, it has been rapidly complicated by the constant widening of the territory in which business is transacted.

"The horse has failed to meet the emergency. Being only flesh and blood, he has only flesh and blood endurance. He could make just so many miles per day at such a speed. He had to be given occasional rests. He had to be allowed a certain amount of sickness. And with the increasing strain, he not only could not cover the ground that had to be covered with the spreading out of our cities, but he became less reliable in the field which represented the utmost of his ability.

"It was those weaknesses of the horse that gave the commercial vehicle its first start. And the inherent qualities of the electric truck have brought it into prominence as a substitute for the horse in city and suburban delivery work.

"The electric truck is unusually easy to operate. Its care is exceedingly simple; and altogether it meets in an eminently satisfactory manner the new conditions of merchandising distribution in our rapidly growing American cities."

Buffalo Truck in St. Louis

The Webb Company, 530 North Vandeventer avenue, has just received a 1,500-2,000-pound electric delivery wagon chassis made by the Buffalo Vehicle Company of Buffalo, N. Y.

This chassis is an innovation, in so much as it is the first medium-priced electric shaft drive delivery wagon offered the St. Louis market. The most important feature of the chassis is the power of transmission mechanism, which has been thoroughly developed. The motor is a standard General Electric design, constructed for vehicle service having a large overload capacity. It is suspended longitudinally over a transverse frame member by two arms, one at either side. The motor shell, or housing, is encompassed by a phosphor bronze nand, on which are two trunnions which are fitted to keys in the ends of the arms, so that the motor may be moved freely on the trunnions.

The motor is coupled to the rear axle housing by heavy Webb tube of large diameter. The assembly being rigid and with the vertical movement of the axle, the motor and the shaft inclosed in the tube has a universal action which eliminates all stresses from road shock.

The battery cradle is underslung and is rigidly braced at the forward end by diagonals to the side member of the frame. The top of the craft is metal covered to prevent leakage and is pitched to insure drainage and fully protect the battery. The sides drop on hinges to the plane of the bottom of the cradle and are supported by heavy guides at either end. Battery is a 44-cell, 13-plate standard Philadelphia.

Chicago the Greatest Market

R. N. Teague, who has just been appointed district manager for this territory of the Standard Electric Car Company of Jackson, Mich., is in Chicago.

"Chicago is the greatest market in the world for the electric car," states Mr. Teague. "This ought to be the best market for a popular electric car such as the Standard, which sells for $1,885.

"The electric car today is built on such scientific standardized lines that you can not improve on its construction to a great extent. The Standard electric includes all requirements that you can ask for in an electric car, and is at the same time popular-priced."

Mr. Teague will have charge of the Standard electric business in Illinois, Wisconsin, Iowa, Minnesota, Kansas, Missouri, Colorado and North and South Dakota. On a recent trip through this territory Mr. Teague found automobile conditions in mighty fine shape, and predicts that 1914 will be one of the greatest years the industry has had. He also predicts that the end of 1914 will find the Standard Electric Car Company one of the largest manufacturers of electric cars in the country.

EDITORIAL SECTION

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CHICAGO, AUGUST, 1913

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ELECTRIC TOURS.

In the May number of Electric Vehicles, S. F. McIntyre, quoting an Electric Vehicle Association paper, commented on the limitations of the electric automobile as to long distance work. That such limitations exist was, however, challenged by Vice President J. S. Codman of S. R. Bailey and Company, in the following letter:

> I have looked over with much interest the first number of Electric Vehicles, and congratulate you on its appearance—which marks an epoch in the history of the electric automobile, and indicates the great progress which has been made.
>
> It would seem, however, that the amount of this progress is not fully appreciated by one of the writers of a leading article in your paper. I am referring to Mr. McIntyre, who makes the following statement:
>
> "The manufacturers of both electric trucks and pleasure cars never intended them for any but city service," and again, "they are not yet equipped for long distance work and cannot be until some radical improvement of the storage battery makes them so."
>
> I certainly do not agree with the above statements, and do not believe that the manufacturers generally will agree with them. I suppose that we are all willing to admit that the electric is not a touring car under existing conditions, but on the other hand, to say it was never intended for anything but city service and is not equipped for long distance work is belittling it in an entirely unjustifiable manner.
>
> There are a number of manufacturers who are now building cars capable of much more than city service. To prove this, you have but to turn to the pages of your last issue. On page 33 you will find an account of a run of 76 miles on one charge of battery made by a coupe. On page 27 there is a note of a car running from Chicago to Milwaukee on one charge. Finally, on page 16 announcement is made of a run by a roadster on one charge from Boston to Springfield and Holyoke, Mass., 114.7 miles, the distance from Boston to Springfield, 93.4 miles, being covered in 4 hours and 55 minutes. When it is considered further that in going to Springfield from Boston this car had to rise 1,000 feet from sea level, it seems rather absurd to talk of the electric as not equipped for long distance.
>
> By all means let us not exaggerate the possibilities of the electric automobile, but on the other hand let us wake up to what those possibilities really are.

Mr. Codman's letter is refreshing because its very tone reveals a confidence of future development beyond any mere business enthusiasm. The sales manager must needs have an optimistic outlook; but the letter plainly expresses personal rather than professional conviction.

If his attitude needed any support, the pages of the June, July and August numbers of Electric Vehicles would afford it. The remarkable 360-mile run of an electric coupe in Enland, as chronicled in our last issue, is alone sufficient to convince the skeptic that distance has lost its terrors for the electric. The present issue records at least two noteworthy runs of the single-charge sort—The Chicago-Cedar Lake trip and the Washington-Baltimore trip.

The long-distance single-charge run is rather a dangerous subject for publication. Distances considerably greater than the claimed capacity can be obtained with almost any car by nursing it along at a low, uniform speed. Such data, if published, may mislead the prospective purchaser into the delusion that the exception is really the rule. Fortunately, however, the manufacturers of electrics appreciate this fact and will not permit such figures to issue as will not stand the test of repitition.

A hundred miles is about as far as the average driver of any kind of car cares to go in one day. Not all present makers of electric passenger cars will guarantee a hundred miles on one charge over all sorts and conditions of roads; but the century mark is at least the standard of everyday practice toward which all are striving, and the increasing frequency of such runs proves that they will not long remain exceptional.

With that mark attained, not as a feat but as regular, reliable operation; and with good road maps showing all charging stations, electric touring will become commonplace, and more popular than gas car touring.

"PETROL-ELECTRIC" CARS.

ENGLAND and the continent of Europe are just now interested, to a considerable degree, in a combination type of automobile called in British parliance, a "petrol-electric." Briefly, the system comprises a vehicle operated by an electric motor or motors, the operating current being supplied, in place of a storage battery, by a dynamo driven by a gasoline engine. The whole outfit, engine and all, is, of course, carried by the vehicle.

One's first thought, without analytical effort, is that the engine, being present anyway, might just as well drive the vehicle, dispensing with the dynamo and motor and their inevitable, if small, losses. It is a fact, however, proven not only by practice, but by means of technical discussion and numerous curves and diagrams, that the gas-electric combination is actually more efficient than the gas car pure and simple. The ability of the engine, used under these circumstances, to maintain a constant speed greatly reduces the necessary factor of overload and makes it possible to do the same work with a much smaller engine. And furthermore, the vehicle gains the perfection of simplicity associated with the electric car; its operation, that is, is that of an electric rather than that of a gas car.

The "petrol-electric" is an electric vehicle in the sense that it is driven by an electric motor, regardless of the source of current supply. It is, however, a gas car in that it does not escape the operation of a gasoline engine, with its ignition, valve and carburetor troubles and its handling of fuel and oil. Therefore, although we have much interesting data on "petrol-electric" performance, we are inclined to discard it. The electric vehicle, as we know it, is a battery driven car.

But that the maker of a vehicle and a gasoline engine should find it expedient, for the sake of electric control, to install additional equipment to the extent of a dynamo and motor, is almost pathetic as a gasoline concession to the overwhelming superiority of electricity.

"DO YOU WANT THE WHOLE ROAD?"

ONE electric car driven down the middle of a narrow street by a beautiful but thoughtless lady, says George Fitch, can keep forty gasoline cars on the low gear behind it and bring the general level of conversation in the neighborhood down 75 per cent.

Keeping two score of gasoline cars on the low gear even temporarily has not, to the lay observer, the aspect of a calamity. The brunt of the general woe must, after all, be borne by the beautiful but thoughtless lady, who is destined to be shocked, humiliated and exasperated by the rasping question "Do you want the whole of the road?" Withdrawing her car as one would withdraw one's skirts from the passing rabble, she indignantly watches the unleashed gas fiends break the speed law; but her pleasure has been tinged with bitterness and her pride injured.

Perhaps the impounded gas car driver, as thoughtless in his own way, may utter some forcible comment on "fool electrics." But in his heart he knows that electricity has nothing to do with his aggrievement, and that what is needed is to impress upon the fair driver the importance of the rules of the road.

Electric passenger cars of today can and do keep up with the gas car traffic, with plenty of reserve. If electric car drivers run slowly, it is from choice and not necessity. That the choice is frequently made indicates that the electric driver is actuated by a sane, wholesome spirit, and is not a victim of neurasthenia, or whatever affliction it is that makes its sufferers dissatisfied with a resonable rate of progression.

Those who go with the rest of the traffic, adopting its average speed, have practically the freedom of the right-hand half of the road, and only the right-hand half. Those who elect to go faster than the average traffic, if permitted to do so by the authorities, must keep to the left-hand edge of the right-hand side of the road—that is, just to the right of the road's center. And those who choose a pace slower than the average must, conversely, keep to the extreme right. This rule, simple as it is, is not known to some lady drivers; or, being known, has not made sufficient impression to become a part of the driving habit.

Women who own electrics are frequently of a class that has had little intimacy with the requirements of business, and to whom the word "traffic" conveys only a remote and uninteresting suggestion of sordid commerce. If they drove gas cars they would operate them in the same way, and at the same speed. They choose electrics simply because they are more easily operated, more reliable, and more cleanly and luxurious, and they are accustomed to luxuries. If they ride in a gas car, a chauffeur attends to the rules of the road. When they drive their own electric, it is not their fault if they fail to observe to the letter a law in which they have never been schooled, and whose importance their training has not led them to observe.

The most casual inspection of a shopping crowd of pedestrians will reveal the fact that a great many women know nothing of the first rule—"keep to the right." It is evidently someone's duty to impress the traffic requirements upon the purchaser of power-driven vehicles, even if ninety per cent of such purchasers may be presumed to be already familiar with them.

AN EMERGENCY BOOST TRUCK.

THE central stations have been an effective agent in advancing the electric vehicle industry. Through their influence garage's have specialized their business, a great many catering exclusively to electric patronage. Private garages have been installed, due to the suggestion of the central station, in order to insure a service for the electric vehicle owners. There would appear to be room for another piece of central station apparatus in the shape of an ever-ready emergency truck answering a call at any place and at any time, and capable of "boosting" a stranded electric. The emergency truck could be supplied with a meter, and the charge figured according to the current supplied. Such an accommodation would do away with the exorbitant expense necessary in calling upon the garage to tow in the car and recharge it.

Operating Economies of Electric Trucks

Some Specific Examples of the Electric's Advantage

BY J. D. HEDDON

AVAILABLE information relative to the work performed by the electric vehicle gives absolute proof of its economy, and the business man who is skeptical concerning the ability of the electric has now no grounds for doubting its great merit. True, all the machines have not given the utmost satisfaction, but it will be generally found that this condition has been due to no defect of the vehicle, but to unintelligent operation. Ill use instead of correct operation is bound to cause the efficiency to drop. If every merchant would go into the electric question with the same careful and painstaking effort that characterizes the methods that win him success in his business, the problem of cheap transportation would be readily solved.

On all sides we see the electric performing in a way that should make any business man "sit up and take notice." We learn from various sources that electric trucks in the service of different companies, both in the East and West, are not only effecting economy in trucking, but are bringing about that all-important essential on a large scale. In general, it is recognized that trucks are the proper hauling equipment, the economical form of haulage, as well as reliable and powerful when compared with other forms of transportation in vogue at the present time.

It is not meant to discredit the gasoline machine, for in its field of application it brooks no competition. But its field of application is not generally found within the city limits. Its principal advantage lies in its ability to travel at a high rate of speed, and in cities this is not permissible. Frequent stops and starts reduce its average speed to below that of the electric, and the total running time possible in a full day's operation is not sufficient to allow of a mileage radius beyond that of the electric.

Paradoxical though it may seem, an electric machine of moderate speed capacity will move faster in city streets and where the stops are numerous, than will a higher speed gasoline truck. The following substantiating figures were taken from tests made under identical conditions. The electric vehicle was geared to a maximum speed of 12 miles per hour and the gasoline to 18.

TEST NO. 1.

Total number of stops	24
Distance between stops	0.42 mile
Duration of stop	2 minutes

Course—triangular; road conditions—good.

	Average Speed M. P. H. Electric	Average Speed M. P. H. Gasoline
Leg. 1. Level	10.76	9.41
Leg. 2. Up	7.08	8.85
Leg. 3. Down	11.12	7.20

TEST NO. 2.

Total number of stops	24
Distance between stops	0.42 mile
Duration of stop	1 minute

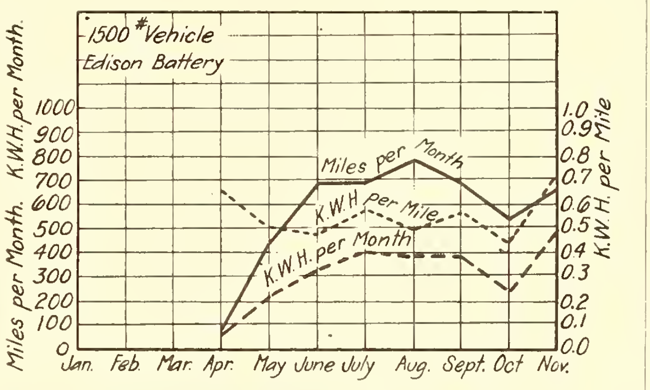
Course—triangular; road conditions—good.

	Average Speed M. P. H. Electric	Average Speed M. P. H. Gasoline
Leg. 1. Level	11.4	10.08
Leg. 2. Up	6.9	7.83
Leg. 3. Down	11.8	10.56

	Average Speed M. P. H. Electric	Average Speed M. P. H. Gasoline
Test No. 1	9.65	8.48
Test No. 2	10.03	9.48

It must be noted that the electric vehicle shows a general average speed of nearly 10 per cent greater than that of the gasoline machine, although the latter was geared to a speed 50 per cent higher. The engine of the gasoline car was kept constantly running throughout the duration of the test. The effect of rapid acceleration and deceleration possible in the electric machine is indicated by the increased average speed even when running down grade.

Nor is the electric machine supreme only in performance. In the item "cost of operation"—ever a vital one in vehicle service—this type of machine shows to the best advantage. In an extended investigation of the operating costs of gasoline and electric machines in several similar lines of business, the data collected disclosed the startling fact that for the electric vehicle the average cost per car mile for maintenance increased only 13 1/3 per cent over a period of four years, while that of the gasoline increased 362½ per cent in the same time; and, further, at the end of the four-year period the maintenance cost for the electric vehicle was less than 50 per cent of that of the gasoline. The exact figures are as follows:

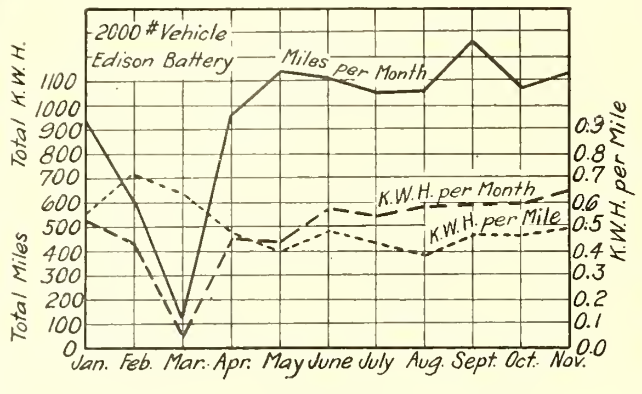


Curves for ¾-Ton Truck, Edison Battery.

	No. of machines reported	Average maintenance cost after 7 months' operation	Average maintenance cost after 48 months' operation
Gasoline	54	4.0c	18.0c
Electric	69	7.5	8.5

The above figures were obtained from the records of the operators themselves and include all items chargeable to the replacment of mechanical parts, storage batteries and tires.

The reason for the disparity between the cost of electric and of gasoline vehicles is found in the simplicity of construction and design of the former. The motor mechanism has but one rotating moving part as compared with several hundred parts in a gasoline machine. The electric machine is free from the intricate mechanical contrivances to convert the high operating speed of the motor to a slow wheel speed for propelling the vehicle. The source of power, the storage battery, is rugged, costs little to maintain, and its reliability is vouched for by the gasoline-vehicle makers themselves, who are equipping modern machines with electrical starting devices, laying great stress on the emergency feature presented by the use of such apparatus; while the remainder of the electric's equipment is much simpler than is that of the sparking mechanism of the ordinary gasoline engine.

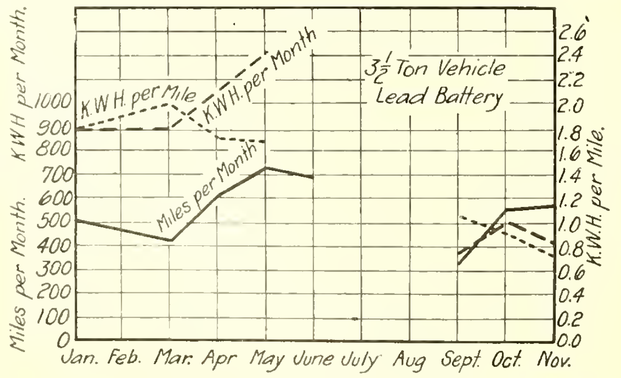


Curves for 1-Ton Truck with Edison Battery.

Because of the characteristics of the motor, which tends to slow down under excessive current flow, the electric machine is not subject to the effect of the abuses of an unskilled operator, which simplicity of construction permits of ready repairs, so that the machine is seldom out of service for any extended period.

The accompanying curves give the results of several months' operation of four electric vehicles of different capacities in the service of a Chicago department store.

In Indianapolis, Ind., a large department store recently purchased six light electric delivery wagons and one one-ton truck, which it placed in service with operators taken from its former horse-drawn delivery wagons. The seven battery-driven vehicles replaced twelve one-horse wagons and two double teams. Following is a tabulation of the cost of operation of the new electric service:



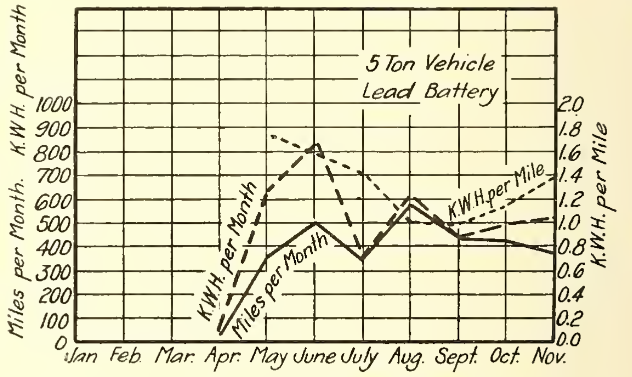
Curves for a 3½-Ton Truck, Lead Battery.

Operating expense, charging, washing, garaging and replacement of parts	$2.00
Fixed charges, including interest and depreciation	1.30
Drivers' wages	2.50
Total daily cost per vehicle	$5.80

These Indianapolis delivery wagons have made as many as 67 miles in a single day during the severe winter weather, although the average mileage has been about 35. The maximum number of packages delivered per day per vehicle was 462, and the average number 241.

In Tarrytown, N. Y., the Rockdale Ice Company uses a five-ton machine for freighting ice between its manufacturing plant and the distributing depot. This truck has displaced 4.7 teams on hauls from 4, 12 and 17 miles in length, and it was found that the total cost of operating the truck for one day amounted to $12.97 as against $21.15 for the teams and wagons, figured on the basis of $4.50 for each horse outfit. The truck covers a distance of 42 miles while the horse-drawn vehicles were able to travel 20 miles. In this instance, although double the mileage is accomplished, a saving of $8.18 per day, or for 300 days $2,454, has been made since the adoption of motor truck service.

Another instance of where real economy has been effected by the use of electric trucks is found in the experience of the Jacob Ruppert brewery in New York City. This company purchased 83 vehicles, during a period of seven years. A saving of $833.33 per machine per year is now being realized by this firm. Out of 120 powerful horses, valued at $1,500 and $2,000 per team, only 45 remain in service, and in the meantime business has increased constantly. The cost of delivering beer when the company was using 120 horses was 33.7 cents per barrel. With electrics it has been 24.75 cents per barrel, a reduction of approximately nine cents on each one. Although the horse equipment hauled about the same load as the electric—11,000 pounds—the distance traveled by each kind of equipment shows a wide variation. Horses accomplish only 12 miles a day, as against a rated battery mileage of 35 for a five-ton machine and a speed of seven miles an hour, practically twice as fast as the horses were able to go.



Curves for 5-Ton Truck with Lead Battery.

In another New York brewery 58 electric trucks are effecting an annual saving of $80,000. Two men, one at $23 and one at $14 per week are required to look after the electrics. This company has disposed of its entire stable of 200 horses and in so doing 28 city lots, valued at $20,000 each, or a total of $560,000 have been released, as the horse stable which was 350 by 350 feet has been replaced with an electric garage 85 by 100 feet, and the ground formerly occupied by the horse stable will be utilized for buildings in which beer will be bottled. The delivery of beer formerly cost this firm 35 cents per barrel, but with the electrics this has been reduced so that within the eight-mile radius the cost of delivery amounts to 15 cents per barrel. It is expected that as soon as additional trucks are installed there will be a further reduction made. It is also presumed that beer will be delivered with the aid of more trucks at a cost of 12½ cents per barrel and this company expects to pay for its complete change to electrics in three years with the savings effected. After that time it can be seen that the saving will become an earning.

The foregoing are but a few of the many instances that could be cited showing the economy of electric vehicles. Considering the increased high average speed of operation in city delivery service and the decreased operating cost, it is no wonder that nearly all large vehicle installations are of the electric type, and that less than 10 active electric vehicle manufacturers are marketing over 20 per cent of the total number of commercial power wagons employed—this in competition with over 300 makers of gasoline trucks.

Trucks Interest Philadelphia Brewers

Philadelphia brewers had an opportunity of seeing electric truck demonstrations during the last ten days.

C. D. Stanford representing the Atlantic Vehicle Company, of 1600 Broadway, had the big gray five-ton electric long distance truck making long hauls in and out of the city.

The runs so far have included all towns in the suburban districts, and have brought the Atlantic truck over every possible kind of road.

C. Schmidt & Sons receive the first series of demonstrations—which included on one day full loads to Bristol and return, covering with side deliveries around the town 46 miles on one charge of battery.

Another day's run covered, with a three-quarter load about 49 miles, to Roxborough and return and to Germantown and Roxborough and return.

Another day covered Chester and Ardmore, with a full load and with a partial load of empties, after which another partial load was taken to Bristol and return, making a total of 52 miles.

Demonstrations were made for F. A. Poth & Sons. The first day's run, to Roxborough and back with a three-quarter load, was the only run that day, and the truck was garaged for the night.

Another run was made to Clifton Heights and return, with an overload, 11,000 pounds.

Upon return to the brewery the truck was given a three-quarter load over the same route, making this extremely difficult trip twice in one day. Once a day is ordinarily a hard trip.

On the 22d a demonstration was made with a full load to Frankford, Bristol and Newportville and Tacony and back to Bristol, and then back to Holmesburg and return to brewery, 57½ miles, running 360 ampere hours.

The truck has run, loaded on city grades with 6 ampere hours per mile, and on hills 7 ampere hours, and on light roads 4 ampere hours per mile.

Examinations were made in the presence of officials, and it was discovered that the regulation size Exide type M. V. 25 Hycap battery was used, which made extra sizes out of the question. G. T. Wellock examined for the Exide Company.

Mr. Standford explained the difference in mileage by the use of standard parts which eliminate friction, Timken axles, Krupp springs, 40-inch rear wheels and steering gear which is easily manipulated, leaving one hand free for the control.

Electric as a Reward for Study

It is altogether likely that were most girls told that in the event of excellence in certain studies a brand new electric car would be theirs, a great deal more midnight oil would be burned than otherwise. Miss Hannah Rubin, 4120 Grand boulevard, worked with no prize of this kind in prospect, but still she attained excellence in her studies and now is the proud owner of a Rauch & Lang electric, bought by her father from the McDuffee Company, 2457 Michigan avenue, Chicago.

While a student at St. Xavier's Miss Rubin won a gold medal for painting. Being musical as well as artistic, Miss Rubin on completion of the course at St. Xavier's entered the vocal classes at the Chicago Musical college. She is now the owner of another handsome gold medal, this time the highest honor in vocal culture.

Naturally her father was proud. It was a case of "What would you like?" Her choice was the Rauch & Lang electric. The selection of the car was left entirely with her and was only chosen after careful test and examination of many makes.

The same determination to excel that enabled Miss Rubin to win gold medals has already made her expert in operating her new machine.

Electric the Popular Car for Women

"The ease with which electric vehicles are driven and the dependence that can be placed upon tire equipment are the fundamental reasons for making the electrics the most popular car for women," says T. H. McGiehan, general manager the Motz Tire & Rubber Company, Akron, Ohio. "Women cannot and should not be expected to crank a motor every time they wish to drive, any more than they should be expected to repair a blowout or puncture. It was essential that the manufacturers equip their machines with self starters. Naturally the woman buyer was partial to a machine with this equipment. This made driving for her much more of a pleasure, as it overcame a large amount of trouble. Therefore it was up to someone to invent a tire that had all the qualities of a pneumatic tire, and with one thing more—puncture proof. Only by ceaseless delving and sifting, was the ideal of a puncture proof tire made possible. Fair motorists can now step into their machines for a moderately long trip, with the positive assurance that the repairing of tires will be the least of their troubles. From statistics it is quite evident that the Motz Cushion Tire is strong with the manufacturers of electric vehicles.

A Poser for the Small Boy

It is reported that the "newsies" up at Wilson avenue and Clark street, Chicago, have entered into a friendly competition to see who can call by name correctly the largest number of automobiles that pass this busy corner.

One lad became so enthusiastic in his shouting that an automobile row critic paid particular attention to him. He said:

"There's a Big Six Pierce, 1913, and behind it is a 1913 Hupmobile. Gee! did you ever see so many Fords! Here comes the Mercer raceabout, last year's model."

Just then the sales manager of the Borland-Grannis Company, William C. Little, drove up in his Borland roadster. This was a stumper for the small boy who was automobile wise. The car came to a standstill directly opposite him, and then, to fill up a gap occasioned by the moving forward of a car in line, the car was driven eight or ten feet forward and stopped. The hood of the car and the general lines of this roadster puzzled the youth, and he was so confused that he forgot to look for the name on the running board, but turned to his companion and said:

"Here's a new one on me. She starts so easy and stops so quietly that she must be some Silent Knight. Did you ever see a car with such a quiet exhaust?"

Electric Trucks to Carry Baggage

Electric trucks to haul baggage between the trains and the baggage rooms of the new Minneapolis union station is the latest development in the plans of the new building. The trucks will run on a covered tramway above the track level. This tramway will surround both the station itself and the mail and express building, which is to be built on the site of the old station, passing under the viaduct where it crosses Hennepin avenue, according to W. K. Tanner, Great Northern engineer in charge of the work. The tramway will also be built over the new power house which is now under construction on the river's edge, back of the new station, and the storage batteries which provide the motive power for the trucks will be recharged at the power house.

Elevators will be used to raise and lower the trucks between the track level and the tramway, and the problem of handling the baggage will thus be simplified to the utmost. The old difficulties arising from handling the baggage on the same platforms as the passengers will be entirely done away with.

Standard Appoints New Agents

During the month of July, 1913, the Standard Electric Car Company of Jackson, Mich., has appointed the following agents:

G. C. Wright, Idaho Falls, Idaho.
Market Garage and Machine Company, Parkersburg, W. Va.
Minneapolis Holding Company, Minneapolis, Minn.
F. S. Hoaglin Auto Company, Oshkosh, Wis.
Universal Garage, Norfolk, Wis.
G. C. Miller Sons Carriage Company, Cincinnati, Ohio.
L. E. Smith, Pittsburgh, Kans.
Watson, Carriage Company, Ottawa, Canada.
W. C. Smith & Co., Richmond, Va.

St. Louis Business Men Adopt the Electric

"The electric pleasure vehicle is not exclusively a woman's vehicle now," says Ralph R. Doak, St. Louis agent for the Woods electric. "Of course, every well equipped household must have an electric pleasure vehicle for the use of the women folks, but the business men also who have to cover short distances in the congested traffic districts are coming to own electric cars. The electric for the business man is even more efficient than the gas car, when one considers the numerous stops and starts necessitated by crowded traffic conditions.

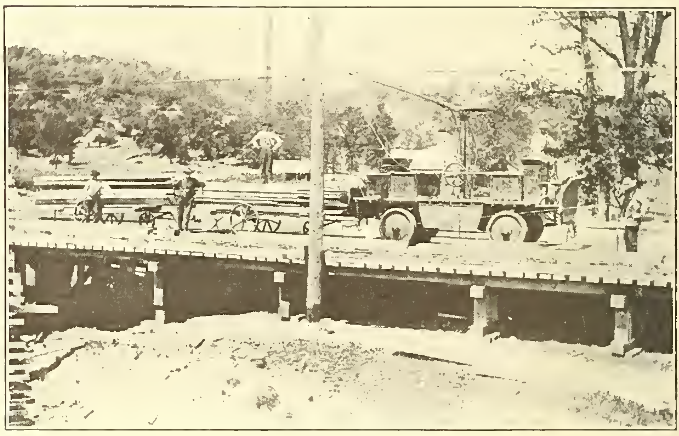
"The improvements have been along two general lines—greater efficiency and larger, more comfortable and more roomy cars. The greater efficiency is due largely to the improvements that have been made in the storage battery recently. This has given the electric greater power, increased speed and longer mileage. The high-grade electric of today will travel from 80 to 100 miles on a single charge depending upon the kind of roads, speed and the care used in driving. Any of our present models will climb easily the steepest hill open to traffic."

Combination Trolley and Battery Truck

The lumber business of California has been, in the last few years, greatly affected by the electric vehicle as a means of transporting lumber. Probably every known method has been resorted to, from oxen and water floating, up to the present adoption of a combined battery and trolley driven electric truck.

The West Side Lumber Company of Tuolumne, Cal., has installed a truck, manufactured by the Couple Gear Freight Wheel Company of Grand Rapids, Mich. The truck is operated part of the time from the trolley and part of the time by the battery.

This method is reverted to because the truck transfers from 500 to 800 tons of lumber per day over a course, part of which, about a half mile, is supplied with a trolley, while the other part, the rough timber districts leading up to the regular course, being covered by means of a single battery. This combination system is used in order to reserve the battery charge, to be utilized in the districts where the trolley cannot be used. The photograph gives us a vivid view of the timber districts off the regular trolley course and settles clearly in our mind that the electric truck has a great many road conditions to negotiate in conveying such a bulk of lumber to the regular course.


A California Lumber Truck.

Auto Parade Perry Day in Chicago

Oliver Hazzard Perry day, August 23, has been set aside for the automobile interests of Chicago. The plans provide for a gigantic automobile parade of both passenger and commercial trucks in which the advocates of the electric hope to make a prominent showing. The parade will start at 40th and Michigan avenue at 1:30 p. m., the cars to proceed downtown through the business district and then to pass in front of the reviewing stand in Grant Park.

Cash prizes will be awarded to owners having the best decorated passenger cars or trucks and firms having the greatest number of commercial trucks or passenger cars in the parade will be presented with a trophy.

Wire Wheels and Some of Their Characteristics

Describing One of the Latest Tendencies in Pleasure Car Design

BY JOHN B. RATHBUN

THE Frayer wire wheel is of the cross spoke type, the spokes from the outer end of the hub crossing to the inner edge of the rim. As the wheel is designed primarily for quick detachable rims, impressions are struck in the groove so that the nipple ends do not interfere with the detachable bead, and therefore leaves a smooth tire base and eliminate the necessity for the use of a flap in the tire coating. An inner hub is provided that contains the bearings of the front wheels and the driving mechanism and brake drum in the case of the rear wheels.

Three driving studs take care of the torsional stresses applied to the wheel through the propulsion and the braking efforts. The wheels are forced on a taper and are retained by a locking nut, that is in turn held in place by a safety latch. Due to the crossed spokes the wheel has a great rut and curbstone clearance making it impossible to damage the spokes by coming into contact with the curb, the outer spokes being practically flush with the rim of the wheel or the outer edge of the tire.

The McCue wire wheel is of the triple spoke construction, having 42 spokes on the inner flange of the hub and 28 spokes on the outer. The spokes, which are of the ordinary nipple and expanded head type are seated in spherical depressions in the rim so that they are free to adjust themselves to any ordinary angle of pull and therefore seat square with the surface of the rim, and below the level of the tire.

An inner hub that contains the bearings, driving shaft, etc., is machined to a taper that fits a corresponding taper in the false hub of the wheel. The inner hubs are moisture and dirt proof and remain permanently on the axles, being fastened by a nut and key. An extending inner flange contains six tapered driving pins that enter through holes in the inner flange of the false hub and transmit the motion from the shaft to the wheel.

A cap threaded on to the inner hub is used both for holding the wheel on the axle and for removing it in case of trouble, this being accomplished either by turning the cap to the right or left. When this cap is unscrewed the collar mounted on an inner extension of the cap acts on the hub and pulls it from the taper joint. A small spring actuated plunger engages with ratchet teeth cut on the end of the false hub and prevents it from slacking off through the vibration of the car.

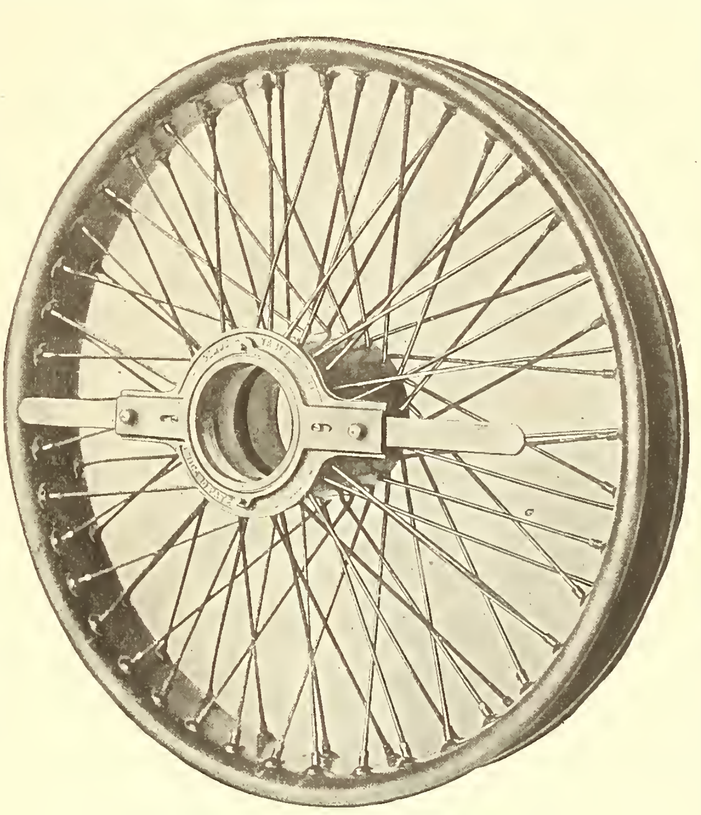


Fig. 7. The Ellsworth-Cross Wire Wheel.

The effectiveness of the outer row of spokes in resisting side stresses is clearly shown by the great angle that they make with the center line of the wheel. The wheel center line passes midway between the two vertical spokes at the rim line giving a nearly equal strain on the two inner rows of spokes. It is claimed by the makers that these wheels have a vertical load capacity of four times that of a wood wheel of equal weight, and a side strain capacity of sixteen times that of the wood wheel.

The Ellsworth-Cross wire wheel is of the crossed spoke type of construction, the two rows of spokes containing 28 and 42 members respectively as in the case of the wheels previously described. This manner of spoke lacing keeps the hub length within the dimensions of the tire and therefore provides road and curb clearance between the spokes and any obstruction that would otherwise cause breakage. The spokes are crossed in the plane of the wheel which eliminates the rigidity of the wheel in the direction of the axle and therefore overcomes all end thrust shocks to the bearings from skidding or the swaying of the car.

The driving connection between the hub and the wheel is made by a plain hexagonal taper which takes out the lateral and radial play simultaneously without the use of driving pins. The outer hub is composed of three pieces, the shell proper being a seamless steel tube into which two forged rings are pressed under heavy pressure. The rings receive the hexagonal taper, and also receive the inner ends of the spokes, the latter making a practically one piece construction as the spokes keep the rings from moving in any direction.

The wheel is forced into place and removed by means of a bronze lock ring that is rotatively swiveled to the wheel itself and engages with a coarse thread on the inner hub. The bronze ring is mounted within a steel ring which serves as an automatic lock release to the two ratchets housed within the outer hub shell. All of the locking mechanism is contained within the hub and not in the hub cap, and through this construction it is possible to withdraw the shaft without removing the wheels or jacking the car, and permits an examination of the bearings at any time.

The wrench is double ended with two lugs extending inwardly to engage slots in the outer face of the

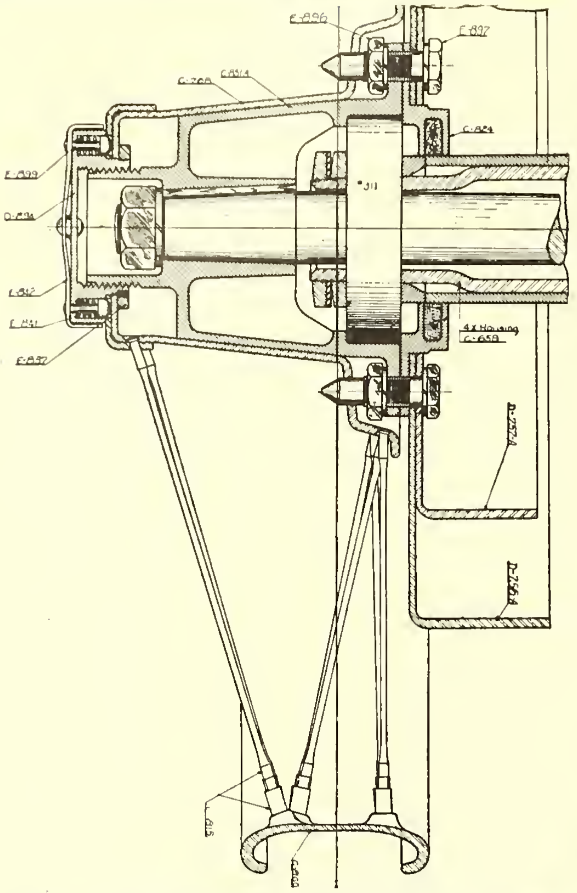


Fig. 8. Detail of the Rear Wheel, Showing the Hub, Broke Drum ond Driving Connections.

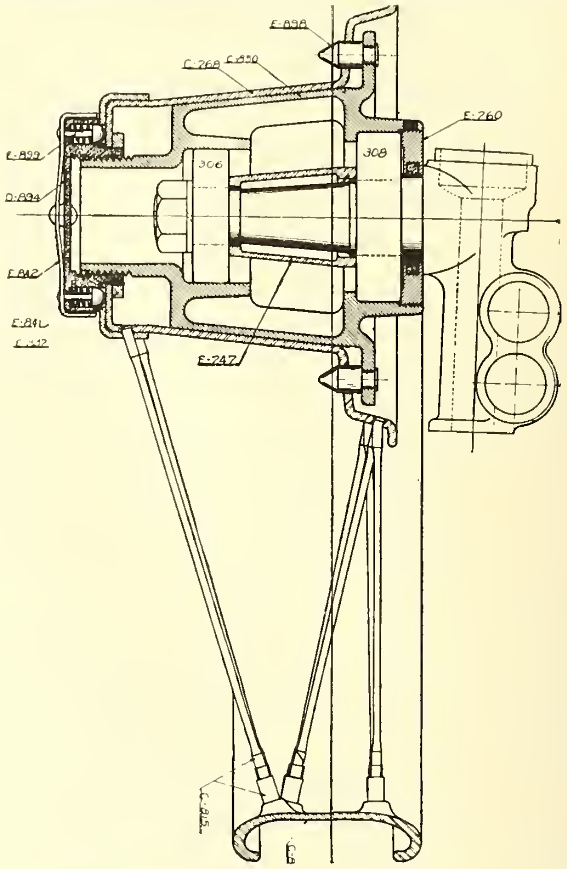


Fig. 9. Front Wheel Construction, Showing the Double Bearings and Steering Knuckle.

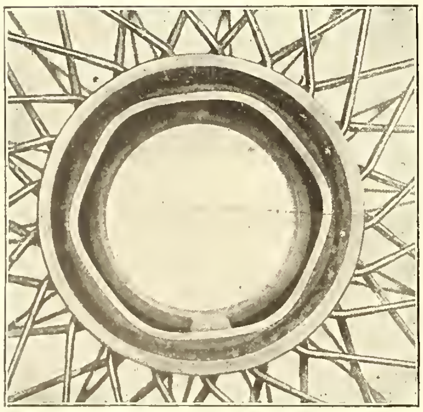


Fig. 10. Detail of the Ellsworth-Cross Hub Construction.

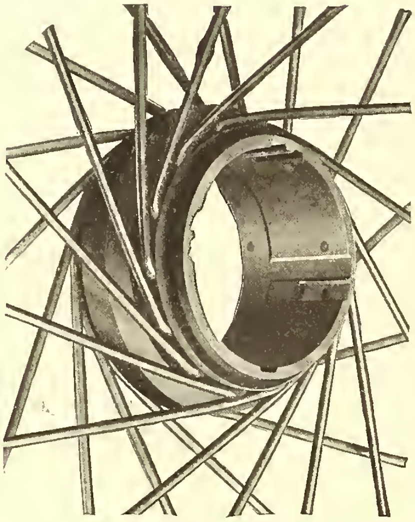


Fig. 11. The Whiteside Wheel, Showing the Details of Spokes.

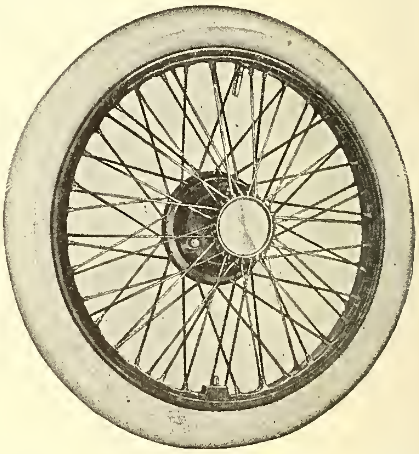


Fig. 12. The Frayer Demountable Wheel.

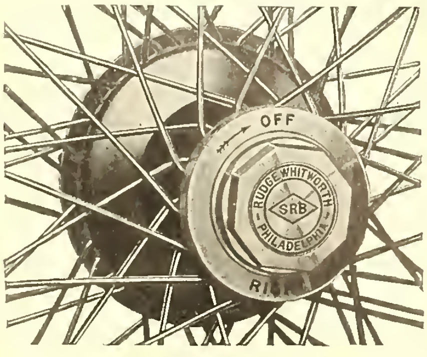


Fig. 13. Rudge-Whitworth Hub with Lock Nut On.

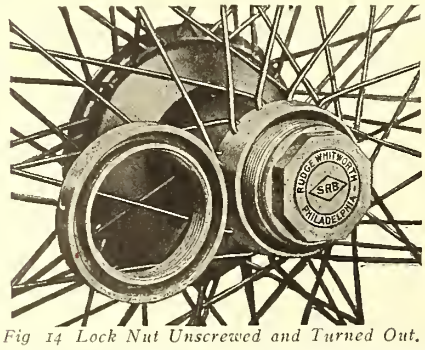


Fig 14 Lock Nut Unscrewed and Turned Out.

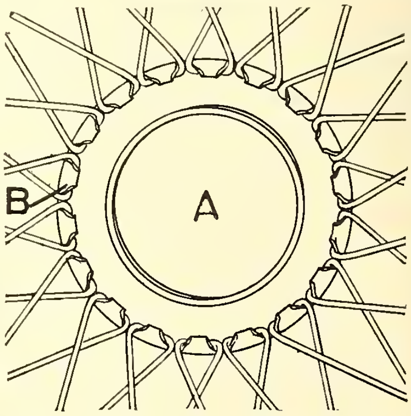


Fig. 15. Hub of the Hill Standard Wheel.

rings. The lock release is affected by having the slot in the inner ring to fit the lugs, and the one in the outer ring longer, permitting a sliding movement of one ring on the other. In the natural motion of unscrewing these rings the lost motion is taken up by the wrench before the inner ring starts unscrewing, thus throwing and holding out the dogs which lock the locking ring.

The Hill Standard demountable wheel which is of the crossed spoke construction, differs from the usual type of construction in having spoke nipples, threads, loose joints or rivets. The construction can be seen from Fig. 15.

The flange of the hub *A* in Fig. 12, is built with several ears, marked *B*, that each hold two spokes, and are rolled over the wire under heavy pressure which makes the wire practically integral with the hub. The spoke wire is cut long enough for two spokes and is looped under the ears as shown in the cut, and then carried tangentially to the rim. After passing through the rim, the wire is bent and carried into the rim flange The end of the wire after being bent lies in the flange groove, and the flange is then bent over making the wire integral with the rim.

The accuracy of the tension on each spoke is governed mechanically by special machinery. It will be noted that the spokes are crossed where they leave the hub which gives resiliency to the finished wheel.

The spokes in the Whiteside wire wheel are tangent to the hub in one direction only on each end of the hub, the spokes passing out of the hub in one direction in the front, and in the opposite direction at the back. This arrangement gives considerable elasticity both in and perpendicular to the plane of the wheel, the action being somewhat like that of an elliptic spring when compared with the ordinary type of construction.

This wheel is constructed without screws, nipples, nuts or threaded parts, and when the parts are once tensioned, the sections are locked with a ring which prevents any loosening in service.

The spoke is bent at right angles and seated in the hub after having been inserted through the rim, and fitted to a socket that practically gives the effect of a ball and socket joint at the rim. As the wheel becomes tensioned one spoke overlaps the other and is drawn against the shoulder of the groove in which the spokes are seated, and this not only insures the spoke being held in the hub, but gives, as well, a three point contact. That is, the hook or bend of the spoke in the hub, the contact of each spoke with the other, and the contact of the spoke with the groove in which it is seated, results in the cessation of vibration at a point about one and one-half inches from the bend, preventing crystallization at the point that has always been the weak spot of the spoke.

The Ashley wire wheel is provided with a quick detachable rim that obviates the necessity of carrying a spare wheel. The demountable band is supported on the felloe band around the entire circumference of the wheel, the locking and retaining means of which is operated from one and a common point of the wheel.

[Editor's Note.—The first half of this article was published in the July number.]

Overcharging reduces the density of the storage battery solution to a greater degree than the normal charge, as more sulphur trioxide is taken from the electrolyte.

Cost of Charging

The cost of electrical energy for charging the batteries of electric vehicles is not an item of such importance as would at first sight appear, says J. W. Beauchamp in the London *Electrician.*

The figures in the table are given by the makers of the Edison battery.

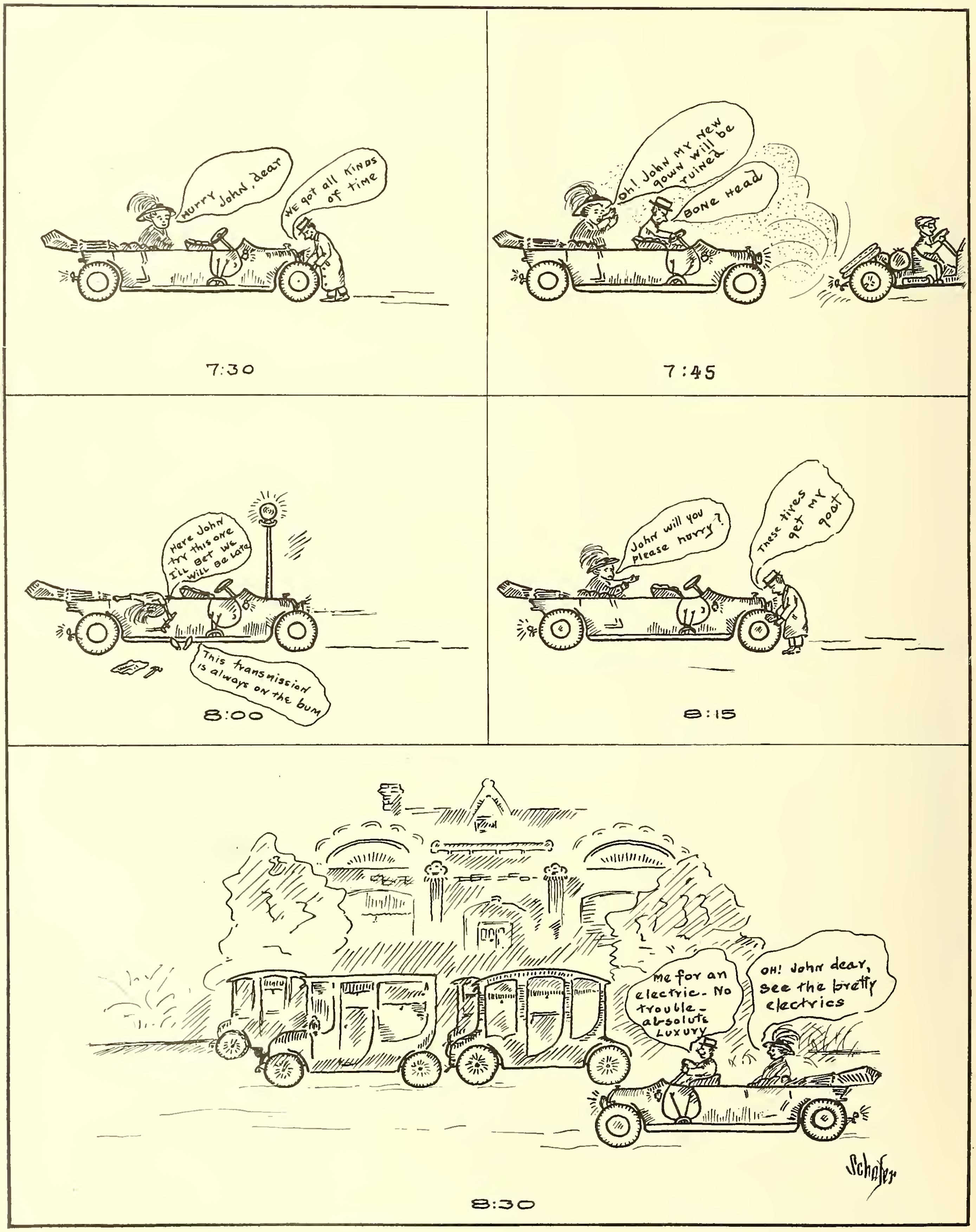
Carrying capacity.	Miles run per year.	Cost of electrical energy per mile at 1d. per unit.	Cost of electrical energy per mile at ¾d. per unit.	Cost of electrical energy as a percentage of total cost per mile.	
				(*a*) 1d. per cent.	(*b*) ¾d. per cent.
lb.		d.	d.		
1,000	.....	0.490	0.370	15.1	8.7
2,000	15,000	0.73	0.55	18.9	15.0
3,000	12,000	0.9	0.69	18.3	14.6
4,000	10.500	1.43	1.07	22.4	16.8
7,000	9,000	2.05	1.54	24.0	18.8
10,000	9,000	2.56	1.87	25.2	20.0

From these figures it will be seen that a reduction in the rate charged of from 1d. per minute to ¾d. per unit whilst reducing the revenue of the supplier by 25 per cent only reduces the cost to the user by 5 per cent. These percentages are based upon figures which contain: Depreciation at (10 per cent); allowance for tires, energy, battery and vehicle maintenance; wages. Where the total figure per mile is increased by lower mileage being run the importance of the cost of electrical energy per mile becomes less.

At the present time it would appear more important to standardize rates than to reduce them unduly. It must be borne in mind that the proper development of the electric vehicle business will entail certain costs for attendance, equipment and advertising on the part of the supplier, which can better be met when a reasonable rate is charged for electrical energy.

First Prize Winner at the Portland, Oregon, 1913, Rose Festival—A Detroit Electric Entered by Frank C. Riggs; Decorated with Marguerites and Pink Caroline Testout Roses Outside, Red Jack Roses Inside; All Natural Flowers.

Unless some attention can be given to the business and a certain amount of publicity work be carried out and assistance given to the users of electric vehicles, it is not likely that much success will be attained in England for a considerable time to come. In future, very low rates may prove a hindrance to the business should it develop to any considerable extent, as there would then be no real room for allowing trade terms to garage owners or for undertaking the proper attendance and accommodation of large numbers of cars in charging stations connected with the supply department.


HURRY John, dear
We got all kinds of time
7:30
Oh! John my new gown will be ruined
Bone Head
7:45
Here John try this one I'll bet we will be late
This transmission is always on the bum
8:00
John will you please hurry ?
These tires get my goat
8:15
Me for an electric- No trouble- absolute luxury
OH! John dear, see the pretty electrics
Schafer
8:30

Why People Buy Electric Cars.

Methods of Advertising the Electric

Paper Read at the New England Electric Vehicle Convention

BY F. NELSON CARLE

Advertising of trucks and of pleasure cars must be of different types on account of the vehicles' respective appeals. The close connection between truck advertising and selling policy is emphasized. Electric truck makers take the lead in sound design, sane speeds, and other fundamentals of long-lived construction, and are leaders also in sound selling. The manufacturer must at first follow the lines of least resistance in selling and perhaps sell the bulk of his goods in given centers and to certain lines of trade. Advertising copy must be adapted to the reader's point of view in order to be effective. The relative values of newspaper, trade paper, and magazine advertising are discussed. Even though the central station does not spend its own money in advertising electric vehicles, it can do a lot for the manufacturer by aiding him in the study of local conditions.

FROM an advertising standpoint the electric truck is a much more prosaic proposition than the electric passenger car. The point of contact is very different. Each has its own field and its own appeal. The manufacturer who can enlist the interest of women readers in his product has a tremendous advantage.

At the same time we are making remarkable progress in both phases of electric vehicle advertising. It should be remembered that advertising parallels the progress of an industry. It need not necessarily be crude in its early stages, but it will lack the proper objective point just as much as introductory selling does. And before I try to tell what electric vehicle advertising has accomplished, I ought to show how such advertising is often influenced, if not restricted, by the selling policy.

Assuming that a good electric truck, in particular, has been developed or acquired by a group of able men, there are two ways in which they can reach the goal of national distribution. One is to start with large capital and tie it up in, say fifteen branch offices until such time as the volume of business will support such a huge selling organization, and the other is to start with moderate capital and a nucleus of, say three branch offices and expand as any old line of business on a sure foundation would. We have left the first mentioned plan largely to our gasoline truck competitors, many of whom have had for years a splendid national selling organization for their passenger cars and are marketing their trucks through the same channels. Some of us feel that the truck would better be divorced from the passenger car in selling, but perhaps that is a matter of opinion.

The motor truck owes much to the automobile, yet it has inherited some things from it which are giving the industry a lot of trouble just now, and one of these is unsound expansion. So we may congratulate ourselves, I think, that not only have electric truck makers taken the lead in sound design, sane speed and other fundamentals of long lived construction, but they are leaders also in sound selling. They recognize that adaptability insures operating efficiency—that permament satisfaction for the buyer is what really counts in building for the future.

Working along these lines takes patience and courage. To be consistent the manufacturer must at first follow the lines of least resistance in selling and perhaps sell the bulk of his product in given centers or to certain lines of trade. He must sell each machine at a profit and sell it only where adaptability will insure high operating efficiency. If he patiently persists in this, his back will not be broken by the free service and repair station, and his reorder business will offset the greater expense of introductory selling in new territory. Little by little he will be able to add branch offices and other units to his distributing system and grow as all business should grow—along normal and healthy lines.

Not all electric vehicle manufacturers look at the selling problem in the same light, but all realize that while we may be in the automobile business, we must make money if we are to stay in the truck end of it. How to make the turnover and expand at that same time is the problem.

So in view of the foregoing, you can see how electric truck advertising is being influenced by selling conditions peculiar to the electric. Over these conditions we have practically no control, though they are improving from year to year. Probably very few of

Baker Special Extension Coupe Climbing the Hills Between Los Angeles and San Diego, Cal.

you realize how hard some of us are working to bring our advertising into harmony with the selling plan so that there will be no lost motion, and every dollar will count. This makes the advertising man chafe at some of the restrictions, but it is good training for him.

To reinforce intensive selling with advertising directed to the whole country not only seems expensive to most manufacturers, but viewed in the light of immediate results, wasteful as well. Perhaps this is why much of electric truck advertising is done in the newspapers of branch office cities to the neglect of other mediums. Each manufacturer does things a little differently. I have found that such advertising, to be most effective, must be localized. No two cities offer quite the same selling problem, and what is true of sales should be true of advertising. Educational copy written on broad lines is helpful in any city, but intensive copy adopted primarily for New York will not fit in Chicago, Boston or other cities. It will not fit because of the variation in three important factors: (1) Road or traffic conditions. (2) Status of the horse delivery contractor. (3) Status of the electric truck. If the electric has a good foothold in a given city and is on the whole well spoken of, it is much easier to produce results from a given expenditure than it would be in a city where these conditions are reversed.

There has been a marked improvement in such newspaper advertising, and when we take our copy away from the sporting page with its golf news and prize fights and put it on the news pages, there will be more. Let those who favor the automobile style of advertising for trucks consider what we are trying to accomplish with a small allowance per truck on a limited annual output, and they may deal with us more kindly. Criticisms are welcome and appreciated so long as they are constructive.

Trade paper advertising has been condemned by many, but not as a whole, I think, by those who have studied the matter carefully. There are many trades which will always be relatively non-productive for electric trucks, but there are others which have already invested heavily in them. Such trades respond to advertising when it is directed to them in the language of that trade. The mistake is too often made of running the same piece of copy in a dozen different trade papers, and that procedure deserves no results.

Manhattan Brewing Company's G. V. Truck.

Magazine advertising is bringing both the electric truck and electric passenger car more and more before prospective buyers, and the importance of the advertising being done by the Electric Vehicle Association of America is tremendous, especially at this stage of the industry. Such advertising has cumulative as well as educational value, and I only wish we individual manufacturers could follow the lead of the E. V. A. with page copy to a greater extent than we do. I have briefly indicated, in general, why we are not in just the best position to invest largely in national advertising at the present time. It would be splendid if each large manufacturer at least could appropriate $100,000 per annum for this purpose, but only a very large volume of business would warrant at this time such a long term investment. Of course, we are getting there by degrees.

Central station advertising in the interest of the electric vehicle is increasing from year to year, and even though the central station doesn't spend its own money to increase electric vehicle sales, it can do a lot for the manufacturer by aiding him in the study of local conditions. For that matter, if we were to carry this spirit of co-operation to its logical end, every one interested in the success of the electric vehicle could aid in a very practical way in increasing its sales.

If I were the advertising manager of an electric vehicle concern in Chicago, for example, trying to help my company open up New England territory, I would certainly consider it of prime importance to know something of local conditions. I wonder how many of you gentlemen have contributed your knowledge of local conditions to the general fund of data on New England as a market for the electric vehicle? If you saw that my advertising failed to take into account conditions peculiar to Boston, Providence, or Worcester, would you, if you were a well posted battery man for example, try to enlighten our local representative in some way or would you let him waste good money in trying to accomplish the impossible under the circumstances? If there is only so much available for educational work on the part of all the electric vehicle interests, doesn't all money so wasted indirectly hurt your end of the business?

About a year ago I had occasion to write a series of newspaper advertisements for a certain town, in which I hammered the shortcomings of the horse with unusual fervor. The advertising fell flat. Recently, I spent two days in that city and got what I thought was a pretty good line on conditions. Just as I was about to get on a train, a friend of mine asked if I knew that a certain department store was going to put in its own delivery system again. A few rapid-fire questions on my part developed the fact that fully seventy per cent of the general trucking and department store deliveries were really controlled by three contractors. The wagons bore the names of the respective stores and had fooled me nicely. Here I had been advertising to merchants of that city about the high cost of their horses when some of them had not owned a horse for five years. That is but one example of what not only we advertising men, but salesmen are up against all over the country, and the central station executive or the local battery or tire man who will co-operate with the electric vehicle manufacturer in posting him on local conditions paves the way for intelligent local advertising. Many a salesman has wasted time and energy in endeavoring to develop electric vehicle sales in new territory with practically no results, simply because information which he should have had was not available to make his work easier. I do not say that it is not every salesman's first duty to post himself on conditions in his territory, but if some individual sincerely interested in the success of the electric of either type were to give the new man on the ground, perhaps in one hour, what it would take the newcomer six months to acquire for himself, surely here is co-operation which will ultimately pay big dividends. In this connection, no advertsing man can possibly hit the nail on the head each time without help from the salesman and the central station on the ground. The branch offices of his company are relatively few in comparison with the countless local problems to be considered, so here is where the electrical interests everywhere can help the whole electric vehicle movement.

Electric truck advertising has already accomplished much more than we give it credit for. It has been believable and has inspired confidence in the storage battery vehicle. It has won men over to a point where they will at least concede the superiority of the electric in its field. Now we must educate them to see the size of that field—to see the tremendous relative volume of city trucking and intercity or other long-haul trucking. Impress upon the prospective buyer the importance of adaptability as a factor in operating efficiency. Keep before him the value of simplicity in construction and operation as a factor in the labor problems. Many electric truck advantages are founded on economic laws, and when a man understands this, he gets away from the all-automobile idea and into the realm of transportation machinery, and that is what we are selling. Our advertisers are not mud slingers, and that counts much in the public mind. Merchants and manufacturers are getting the impression that we are trying to build as we go instead of trying to cover the country with our product in twelve months, and that appeals to them, since it is in harmony with sound business principles. These impressions gaining in volume from day to day stamp the electric, not as something marketed in haste only to be distanced by the 1914 model, but a machine backed by a principle which is right, and so must endure.

A group of Edison storage battery salesmen at a sales conference at Orange, N. J., July 11. President Thomas A. Edison in the middle. On his right R. A. Bachman, vice-president and general manager, and on his left William G. Bee, manager of sales. Others in the group are E. J. Ross, manager of sales-engineering department; H. L. Davisson, manager of service department; H. G. Thompson, manager of railroad department; C. A. Poyer, manager of house lighting department; H. R. Leisk, assistant manager of sales; John Kelly, manager of New York office; C. B. Frayer, manager of Chicago office; G. W. Holden, Boston, and A. O. Heister, Buffalo.

I look forward to the day when this industry will draw to it the keenest advertising minds of the day; men who make their work a religion rather than a pastime or means to an end. In the selling end we are slowly but surely being favored with clean-cut men who are a splendid asset. They come not so much to get in on the ground floor as the industry takes a boom as because they sincerely believe in the electric principle. And we need men of this stamp in the industry, even more than we need additional capital. If we can bring our advertising up to where it will create that spirit of spontaneous confidence, not only in our product but in our way of doing business, we shall not lack boosters. And certainly the world smiles at the man whose heart is in his work.

Keep the level of the storage battery electrolyte well over the tops of the plates. If this is not done the capacity of the cell will be greatly reduced and the danger of sulphating increased.

Massachusetts Registrations Show Increase

E. S. Mansfield, vice-president of the Electric Motor Car Club of Boston, stated in a recent interview, that the registration of electric trucks in Massachusetts for the seven months ending July 26, shows a gain of 92 per cent over the number of machines of this type in the state a year ago.

The electric truck industry, as Mr. Mansfield pointed out, has reached a development competent on a small scale to duplicate practically every other form of land transportation service. Recent sales of electric vehicles at Boston include a 5-ton General Vehicle ice wagon for the Central Manufacturing Company to operate on a schedule of about 35 miles per day between the Dorchester section and the wholesale market district. An important factor in adopting the electric vehicle in the ice business, is due to the savings in leaks resulting from the speed of the electric as compared with the former horse-drawn method. The Edison Electric Illuminating Company of Boston has added six General Vehicle 2-ton electric trucks with winch equipment to its fleet, and these units are provided with extra large batteries in order to facilitate rapid and heavy work in line construction and maintenance on hilly roads and streets in the suburban districts. The company now operates a total of forty-two electric vehicles. The Boston coal dealers have recognized the superiority of the truck resulting in much popularity especially among the suburban dealers who are rapidly supplying themselves with the electric vehicle equipment.

In the central-station field, the new Bedford (Mass.) Gas and Light Company now operates some eight machines.

West Wonderful Field for Electric

T. H. McGiehan, general manager of the Motz Tire and Rubber Company, Akron, Ohio, who recently returned from a visit to the Pacific Coast, says: "The West is a wonderful country for the electric. At the present time both the electric pleasure and commercial car hold an eminent position. The excellent roads throughout the Pacific Coast, especially California, afford bright prospects for this type of machine. Considering the perfection of good roads, which seems to be one ambition of the people in this territory, the future of the electric is unlimited.

"This movement is bound to have a wonderful effect on the already growing popularity of the solid cushion tire. Not only is the electric pleasure vehicle popular in this section, but also the electric truck. There is a big field for them, and no doubt a year's time will see the present number practically doubled.

"The western states along the Pacific Coast raise an enormous quantity of fruit. The rapidity with which these products can be delivered to shipping points by trucks is appreciated by the fruit growers as they fully realize that their product is one of a perishable nature."

Upkeep of Electrics is Small Figure

In speaking of conditions in Sacramento, Cal., that are favorable to the use of electric trucks for all local purposes, Charles Graham said that comparing the figures of maintenance complied by the Baker Motor Vehicle Company, the figures being gathered from all conditions throughout the United States, that the cost of upkeep in Sacramento has been 50 per cent cheaper than the actual cost published by the company.

The actual cost of renewed parts in the Sacramento district is four times less than the actual cost found by the company. This is because of the ideal conditions in the city—good streets and level roads. Where a good average of time can be made without any strain on the cars and care given them by the local firm has materially assisted in the prolonged life of the trucks with small upkeep expense.

That Baker electric trucks are in service 98 per cent of the working time and at times Sacramento can have exceeded this limit and proves conclusively, according to Graham, that a positive guarantee can be given as to upkeep and amount of work that can be done by electrics.

A Department Store's Electric Bus.

The Famous and Barr Company of St. Louis, Mo., has installed a General Vehicle 5,000 pound truck built in the form of a bus used to transfer the general public to and from its department store and the McKinley railroad depot, a round trip of a half mile.

St. Louis Store's G. V. Bus.

The bus has a seating capacity of eighteen people. It has a maximum record of having carried 450 people in one day. The truck runs continuously all day, averaging 32 trips daily except on Saturday when it makes three extra trips. There is no fee charged for the ride, the bus acting merely as an accommodation to the patrons.

Duluth Has Up-to-date Electric Service

Since the installing at the R. & R. garage of an electric service plant this concern has been offering the electric vehicle owners of Duluth, Minn., an unequaled service in this district. This department is handled by experts and the apparatus is up to date in every way. Their repair department also is under the supervision of experts and is putting out first class work; there is no better place in the northwest to have your car remodeled or repaired. Prompt and efficient service says Mr. Rolillard, the proprietor, is its motto for success.

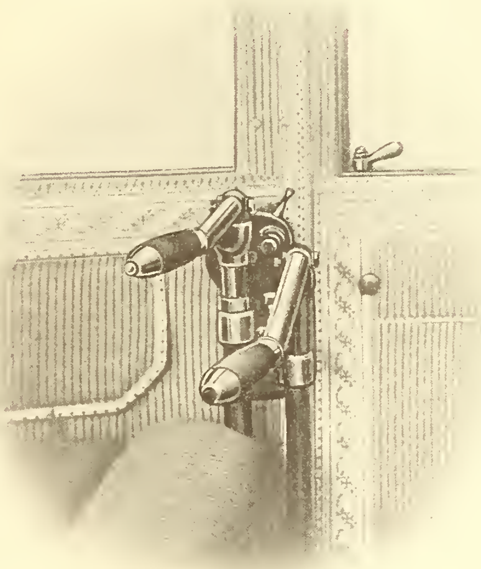
Borland-Grannis electrics are inspected at least once a month at the Borland service station and oiled and lubricated.

The Manufacturer's Story of the Electric Car

Painstaking Construction Work that the Buyer Does Not See

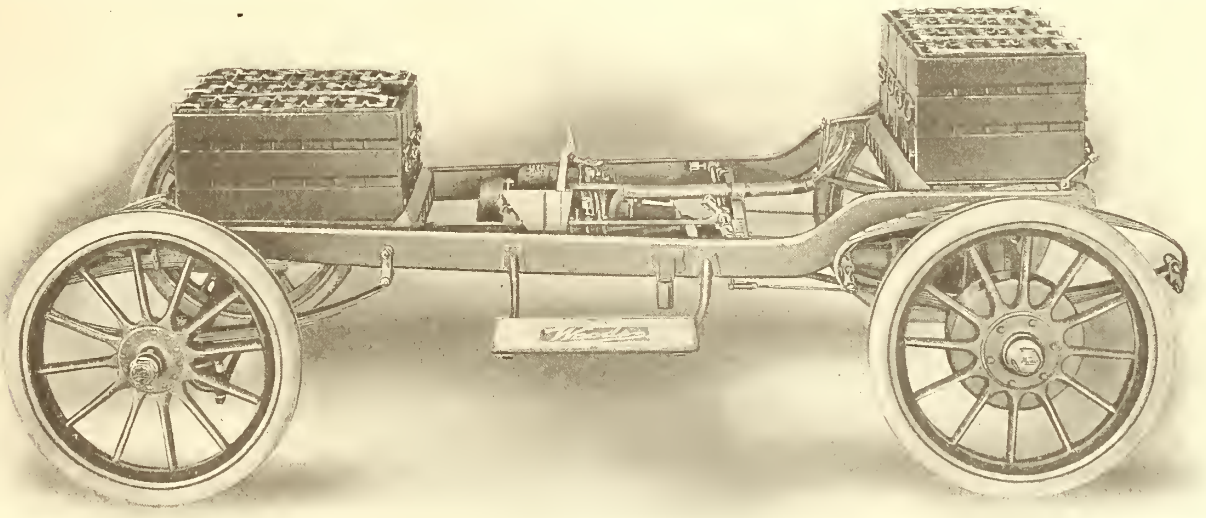
BY EUGENE DENGLER

THE general public has ample opportunity to appreciate the developments of the electric vehicle as to its more graceful lines, its rich and artistic trimmings, its safety and ease of control, its cleanliness, noiselessness and reliability. Yet with these outer developments, there exist constant changes in the general construction which, from the manufacturers' standpoint, act as the principal factors in making the electric a car of quality and luxury. Every model brings forth new products, the results of long experiment, all tending toward one goal, the perfection of a car combining the utmost possibilities for service and comfort with a minimum of necessary expense and attention for maintenance and up-keep. Each individual part of the general construction acts as an important factor in relation to the car as assembled.



Control Lever Ready for Driving, Steering Lever at Right.

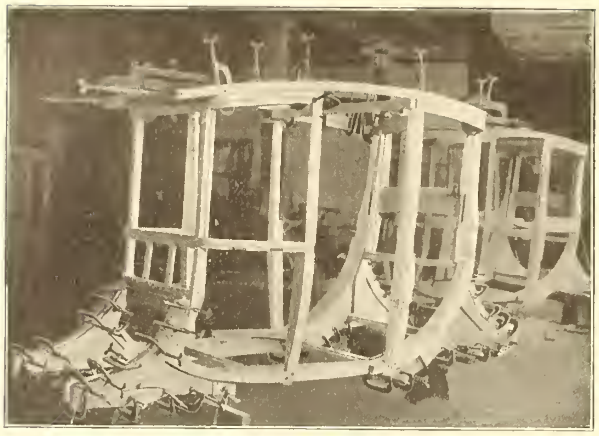
The Woods Company claims that "No electric vehicle is better than the chassis which supports it." The chassis frame is essentially the "backbone" of the car. It must be constructed to resist tremendous breaking strains,—must combine lightness and flexibility with great strength. Its parts are riveted together, then welded by the acetylene process. The side and cross members of the chassis frame are channel steel, every piece given individual heat treatment.



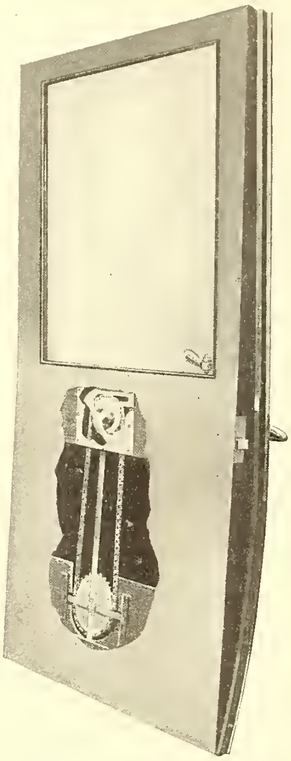
Woods Chassis Showing Batteries, 20 Cells Front and 20 Rear.

Heat treatment is that process which gives to many of the finest steels much of their splendid quality. This process improves the texture and quality of special high grade steel until it is fine enough to be made into bearings, axles, springs and other parts. The treatment will not make fine steel out of poor material, but it brings out to the fullest extent the durable qualities of toughness, hardness, or resistance to vibration in the finest obtainable steels. This process is a comparatively recent discovery, the methods of which are highly technical and require the greatest care and skill to secure absolute accuracy. During the process the texture of the steel becomes more refined, closely knit and durable.

After double riveting, the parts of the chassis frame are welded in their places by means of the acetylene process. This method subjects the metal, where joined, to intense heat, causing the parts so treated to knit together. When all the cross and side members have been thus welded the whole frame forms what is really one piece of steel strongly braced and reinforced by rivets at each joint. The side members of the Woods chassis frame taper decidedly to a narrower width at a point over the front axle, thereby leaving a wide space for each front wheel to swing in turning sharp corners, and allowing the car to turn around within a very short radius. Another important feature of the Woods chassis frame is the proper provision for attaching the battery trays securely and solidly. Projecting lugs on either end of the battery trays engage a cross member of the chassis frame at one end, and at the other are bound securely by cross bars held in place by heavy bolts attached to the side members of the frame.


Body Skeleton in the Glue Room.

The batteries in the new models are of a special type. The equipment consists of 40 or more cells of eleven plates each. The cells have a three-inch sediment space at the bottom of the jar which is ample to provide for all material which will slough off the plates during their life, thereby eliminating the necessity of washing the batteries. The positive plates are of such thickness that they will last as long as the negatives. Relative to charging the battery, a new style receptacle has been adopted provided with a counter to register the number of times the battery is placed on charge. Used in connection with the odometer, this reading enables the driver to determine at all times the average number of miles he has obtained per charge. The importance of this is due to the fact that a great many people charge the battery more often than is necessary, and thereby needlessly shorten its life. The battery hoods are so constructed that when open, the cells are all exposed. The capacity of the batteries are determined largely by the speed, the conditions of the road and care used in starting and coasting.

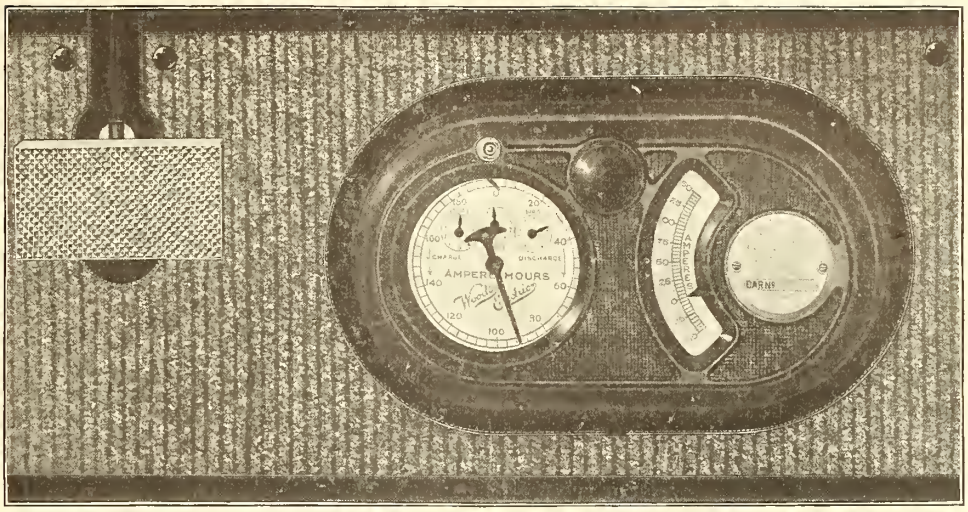

Window Adjusting Mechanism. With this Device the Window is Raised and Lowered by a Turn of the Handle, or Locked in Any Position.

The body of the car is another important feature. Herein lies the beauty that attracts the attention of the general public. The sheet aluminum is pressed and pounded into shape. The framework is built out of material cut from the rough boards. The bodies are made up of various kinds of wood, using hard wood where strength is required. Some parts of the body are made of softer woods, which gives a stronger connection due to the fact that glue holds better in the softer, more porous wood. The main body frame is very strong due to the many reinforcements to the metal panels. Practically all the panels are thick pressed aluminum. The bridged, or arched shape of all four quarter panels is an important factor in giving them their great strength. The panels are securely fastened to the body and the joints are covered with aluminum moulding, held in position by counter-sunk screws, two inches apart, the heads being capped over with aluminum. The counter-sink is then riveted over the aluminum cap and filed down smoothly before painting. In addition to making a very substantial body, this method of construction leaves only the aluminum exposed to the paint, and avoids the possibility of any electrolytic action.

Body After Applying Aluminum Panels.

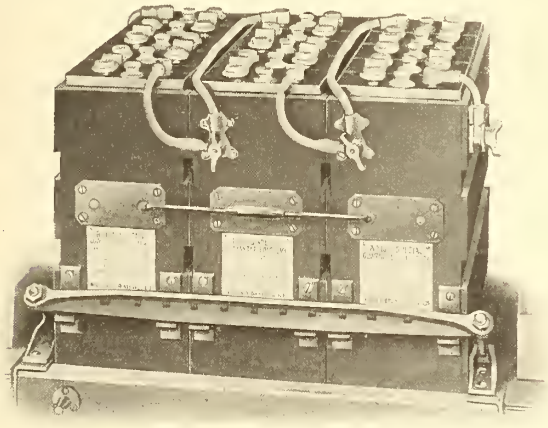
The upholstering is made according to the latest designs in trimmings. The cushions are soft and luxurious, the rear cushion usually ten inches deep. The springs used in the seats are of improved construction, being attached to each other in such a way as to make it impossible for them to get out of alignment. The windows are frameless, each window moving freely in galvanized metal grooves. These grooves are provided with drains which prevent the water from injuring any part during bad weather or the washing of the car. The rounded glass window in the rear allows a clear view and insures safety in making a stop on crowded thoroughfares. The interior seating is arranged so that all occupants may sit facing forward, the car being driven from the front left hand seat. The forward seat opposite the driver may be reversed to allow the passenger to face the rear if preferred. A novel form of construction which adds considerably to the roominess of the rear seat is brought about by allowing deep pockets in the sides of the car at the ends of the rear seat cushion.

The ease of control establishes the safety of the electric. Every movement of the car is effected by two levers, placed where the hands rest naturally upon them. The power controller lever, which is used in shutting off the power, is operated with the left hand. A single movement in the reverse direction cuts off the power and applies the motor brake. The steering lever is placed a few inches lower and in front of the power lever, and is operated by the right hand of the driver. It is a much longer lever than the other, and gives ample leverage to make the guiding of the car easy. The safety device known as an emergency switch, or reverse lever, is operated entirely independently of the control lever. When this switch lever is in an upright position, the current is cut off, regardless of the position of the controller lever. When the power has been so cut off, it is impossible to start the car again until the controller handle is moved to "off" or brake position. It is also impossible to set the motor brake with the power on. This reverse lever or emergency switch may be locked to prevent operation of the car should it be advisable to do so without locking the car door. A heavy strip of body padding tape is placed between the chassis frame and the body, making it possible to fasten the body more solidly and entirely eliminating vibration at this point.



The Ampere Hour Meter and Ammeter.

After discussing the three larger parts and the care given in their construction to resist, in addition to vibration, the severe twisting to which they are constantly subjected, let us consider the next important factors, the oiling system and the bearings, which enable the manufacture to obtain easy riding qualities even on poor roads. It is very essential that the springs be of sufficient size, strength and resiliency to assure comfort in riding, and increase the durability of the car. The Woods springs are composed of seven leaves or layers. The steel used is known as chrome silica manganese steel. The resiliency and strength of the spring depends upon its design, the number of leaves, and the thickness of the leaves as well as the quality of the material used in their manufacture. Of two springs of a given design, size and weight, one containing the largest number of thin leaves will give better riding qualities than a spring made with a fewer number of leaves having a greater individual thickness. This is due to the fact that it is the steel in the extreme top and bottom of each spring leaf, which really performs the work. The combination of high grade steel, with large cross-sectional areas, and a larger number of leaves combine to make the spring last, and will, in itself, greatly increase the durability of the machine as well as increase its capacity for satisfactory service and easy-riding qualities.



Woods "Special Guaranteed" Battery.

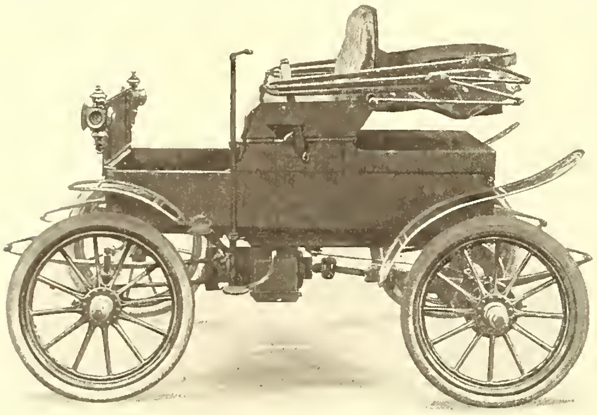
The elimination of friction in the bearings and other parts of a car is one of the most vital essentials to good service and maximum durability. Friction reduces speed and mileage, and causes much necessary repair trouble. No car can possibly give satisfactory service, for even a limited period, which does not have good bearings and proper lubrication. The more perfect the bearings in quality and suitability, along with proper lubrication, the more ideal will be the service of which the car is capable. Bearings are to the car exactly what fine jewels are to a watch. Just as, and for the same reason that the finest watches are "full jeweled" all electrics should have the very finest grade of imported annular ball bearings in every revolving part. These bearings are so fitted as to make them practically frictionless, and the only care necessary is to lubricate them occasionally.

Forward, in the center of the toe board and directly to the right of the foot brake pedal, the ampere hour meter and ammeter is sunk on a level with the floor. The ampere hour meter shows on the dial the quantity of electricity which has been drawn from the batteries since the last charge—also how much current still remains. It enables the driver to determine with reasonable accuracy at any time, the approximate number of miles he may obtain from the charge still remaining in the batteries.

The operation of this device is easily understood when it is explained that the units of energy as applied to electric vehicles are known as ampere hours. The ampere hour meter simply measures these units as they go into the battery during the operation of charging and as they go from it again and are used up in propelling the car. The single large hand on the round dial moves to the right and downward from "0" as the current is being used in operating the car. As the car is being charged the hand moves upwards toward "0." At all times the position of the hand indicates how much current has been taken out and how much still remains in the battery.

The dial of the ampere hour meter is numbered from "0" to 200. When the battery is empty, that is when the current has all been discharged from it, the large hand will point at 140 on the dial, showing that 140 ampere hours of electricity have been taken from the cells. As the car is being charged the hand will gradually move back to "0," which will indicate that the battery is fully charged. When the car is operated the hand will move down from "0" as the current is used. As an example, when the hand points to 70, it indicates that 70 ampere hours, or one-half of the total capacity of the battery has been used since the battery was charged. The ampere hour meter prevents the possibility of your finding yourself far from home or charging station with the batteries of your car empty. The driver can at any time tell just how much current he is using, and what proportion of the original charge is still available. With this record constantly visible there is no chance of his unexpectedly running short of power.

When the batteries are conected with the charging current, the ampere hour meter records the number of ampere hours of electricity delivered to the cells, the large hand moves around in a circle from 140 to "0." As the hand reaches this point it strikes a contact opening switch called a circuit breaker, which automatically cuts off the current, making it impossible to injure the battery by overcharge. To give the battery cells the customary occasional overcharge, it is necessary simply to turn the hand back on the dial the number of ampere hours specified in the instructions, for the purpose of giving the battery the desired overcharge. The hand of the ampere hour meter may be turned back by the use of a small key, which is inserted near the top of the dial case.



Woods First Shaft Drive Model of 1904.

The ammeter is the curved dial at the right of the ampere hour meter. This instrument indicates the volume of current that is being taken into or delivered by the batteries. The hand on this instrument stands at "0," except when the car is in operation, or is being charged. The hand will always register above "0" while the current is being taken from the battery, and the hand points to the figure indicating the number of amperes. During the process of charging the hand will move below "0" and will indicate by its position on the curved dial the number of amperes being delivered from the charging wire to the cells of the battery. The ammeter further serves to show upon which speed the car may be most economically operated.

Perfection is made up of trifles. The latest models show choice selections of the quality and arrangement of their minor details.

The bell push-button in the end of the controller handle is connected to the bell and batteries by insulated copper wire inclosed in metallic tubing.

The switch, by means of which the interior and exterior car lights are turned on and off, is operated by means of pull handles—one handle to each switch. This makes it possible to turn any switch on or off in the dark, as the position of the pull handle indicates when the lights are on, and when they are off, regardless of whether they can be seen from the driver's seat or not. This same switch plate contains a push-button for the meter light.

A new development, in the form of a special device, allows the windows to be lowered and fastened in any desired position.

The two large lower front lamps are attached to the chassis, each lamp being supported by a piece of spring steel securely bound in with the upper half of the front spring and held in its position by spring clamps, which method obviates any ill effect produced by the vibration of the car. The side light bracket on the Woods car passes through the body frame with the wiring protected in the center of the hollow bracket.

To avoid the necessity of locking both car doors with a key when leaving the machine standing unattended, the door on the left-hand side is provided with a lock, operated by a button conveniently placed just below the latch lever.

A still further feature of the new Woods models is the hard rubber covering on all lever and door handles, affording a refined and pleasant touch together with great durability.

The details of manufacture described in this article apply to a specific make of electric pleasure car; but the extreme care so evident in each process is only one example out of many, each manufacturer having his own methods and designs, and each doing all that is humanly possible to create a product as nearly perfect as the mechanics of the year 1913 will permit.

Improving Sacramento Electric Garage

One of the new business concerns of Sacramento, Cal., is that owned and managed by James F. Pieper, who has taken over the electric garage business formerly maintained by Fred T. Kitt, which carries with it the agency for the Detroit electric cars.

It is understood to be the intent of Mr. Pieper to build an electric car organization, including up-to-date electric car service and a sales organization to promote the use of a larger number of pleasure and commercial cars.

Mr. Pieper is now embodying in his plans very extensive alterations to the electric garage at 1910 M street. J. W. Klein, formerly factory branch manager for the Anderson Company, is sales manager. Elliott Higgins, the Pacific Coast representative of the Anderson Company, will make his headquarters there for a greater part of his time and this means several live young men to be added to the growing list of business men in California's capital city.

Heating the Steering-Wheel Rim

To avoid the difficulties resulting from a cold-steering wheel, Rueben S. Smith of Marshall, Texas, in a patent, No. 1,062,745, arranges an electric heater of a special construction described in the patent, in the hollow rim of the handle wheel, so that the rim will be heated electrically.

Examples of Electric Truck Efficiency

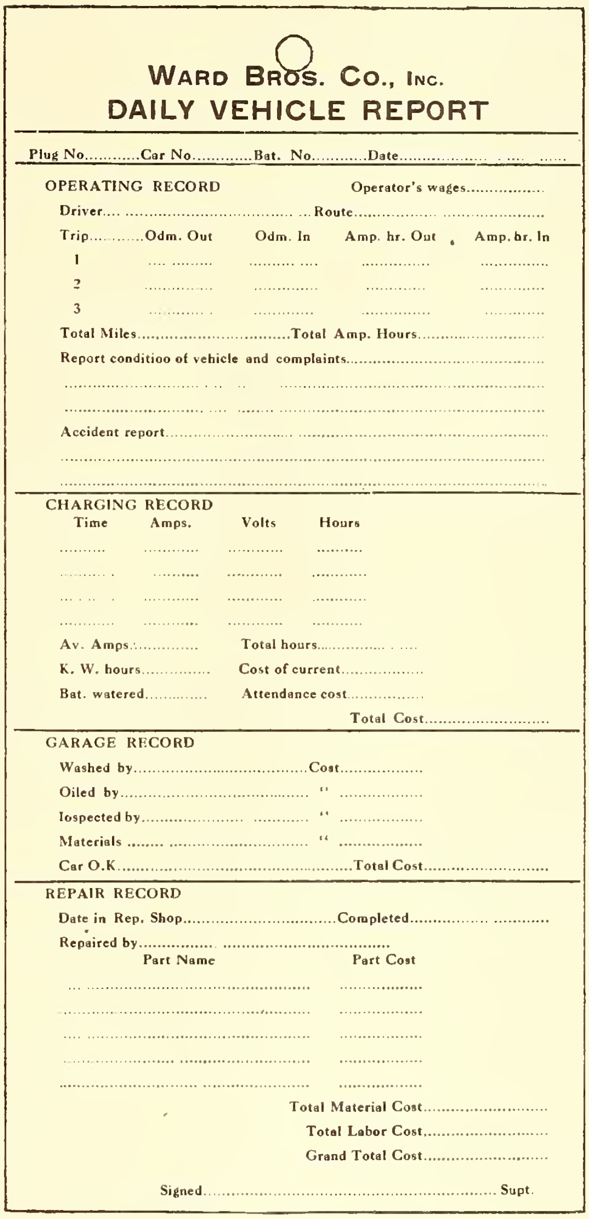
A Few Random Observations on Recent Installations

BY LAUGHLIN K. SMITH

JUST how rapidly the electric commercial vehicle will advance in the next few years is a question of much discussion and estimation. Manufacturers have realized the importance and the efficiency of the service obtainable from an electric truck. Just as one word tells why the electric was so long in a rut, the explanation of its remarkable progress to its present high standing may be summed up in one word: Knowledge.

Assured of the value of their cars, manufacturers began to scheme to educate the business men. Probably the best factor in this entire effort to educate has been the vehicle itself. Demonstrations have proved the value, the business man has recognized and accepted the truth and as a result we find our most successful companies installing truck after truck in order that they may bring about a service more valuable to the public and more profitable to themselves. For instance, the Manhattan Brewing Company of Chicago has purchased five G. V. electric trucks, all equipped with Edison battery and of five ton capacity. One of these has been in service for several months, and the other was put into service recently. The first machine, which is No. 15, has performed away beyond the company's expectations and has done really remarkable work.

On Monday, Aug. 4, this five ton truck started for South Chicago, with a load of 33 barrels and two one-half barrels, approximately 6½ tons in load. It returned to the brewery for the second load, taking out 29 full barrels and 8 one-half barrels. At this time the truck was given a 30 minute boost, and directly after luncheon it started out with its third load of 33 full barrels, which made a total of just 100 barrels for the three loads, making the weight of approximately 40,000 pounds or 20 tons. Besides taking these three loads straight from the brewery to South Chicago, so that the total mileage for the three trips was 64.3 miles, the truck did five miles of peddling in South Chicago. The ampere hour meter reading for the day's work showed 70 ampere hours left in the battery, which is approximately 7 miles.



WARD BROS. CO., INC.
DAILY VEHICLE REPORT

Plug No............Car No............Bat. No...........Date....................

OPERATING RECORD Operator's wages..................

Driver.......................................Route..................................

Trip	Odm. Out	Odm. In	Amp. hr. Out	Amp. hr. In
1	....	....	....	....
2	....	....	....	....
3	....	....	....	....

Total Miles..............................Total Amp. Hours..........................

Report conditioo of vehicle and complaints...

....

....

Accident report...

....

....

CHARGING RECORD

Time	Amps.	Volts	Hours
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....

Av. Amps............... Total hours...............
K. W. hours............... Cost of current..................
Bat. watered............. Attendance cost.................
Total Cost..........................

GARAGE RECORD

Washed by.....................................Cost..................
Oiled by....................................... " ....
Iospected by.................................. " ....
Materials.. " ....
Car O.K..Total Cost..........................

REPAIR RECORD

Date in Rep. Shop...............................Completed.........................
Repaired by...

Part Name	Part Cost
....	....
....	....
....	....
....	....
....	....

Total Material Cost..........................
Total Labor Cost..........................
Grand Total Cost..........................

Signed..Supt.

Daily Vehicle Report Form of Ward Brothers.

This performance for a five-ton electric truck shows that it is able to do work that was formerly considered strictly the field of the gasoline vehicle.

The Consumers' Ice Company of Chicago also has supplied itself with a pair of G. V. electric trucks. The electric is an ideal method of transportation for house to house delivery.

The rapid advancement of the truck furnishes a promise of a great future, due to the fact that in its stage of development, fixed probably by a space of the last ten years, we find the electric scattered over the country, even in fields that would seem unadapted, each acting as a representative in actual demonstration. This has been almost the sole means of educating the business man.

Savannah, Ga., railway and steamboat wharves have finally

CONSUMERS ICE
DISTILLED WATER IN BOTTLES
CONSUMERS ICE COMPANY
DISTILLED WATER IN BOTTLES ASK THE DRIVER

Two General Vehicle Electric Trucks Used by the Consumer's Ice Company.

Woodward and Lathrop's Fleet of G. V. Electric Trucks.

mastered the freight question by means of some 50 odd electric trucks, thereby reducing the cost of handling cotton from 8½ cents a bale to 1½ cents.

Ward Brothers Company's Garage for Ward Electric Trucks.

There is a fleet of six G. V. electrics, three of which are over seven years old, in daily service of Hammacher, Schlemmer & Company, hardware dealers of New York City. This company claims that the trucks have proven that quick, reliable deliveries have made for constant success in its business by pleasing its patrons.

The electric truck has always found its way into the most successful companies. John R. Thompson, no doubt the largest commissaire in Chicago, has built a model garage in his new commissary, in order that he may accommodate fifteen G. V. electric trucks, which are in use daily in deliveries between his restaurants.

The success of the electric truck has been proven by its own record. Ward Brothers Company, Chicago, bakers, has a record card designed by its engineering department showing the actual work completed by the truck and the necessary expense of maintenance. The employes are instructed as to the necessity of turning in a proper report not only to ascertain the amount of work done, but also to show the exact condition of the vehicle.

Probably the greatest advantage of the electric truck is its reliability—the fact that it goes and comes back, and that so little of its time is wasted in the repair shop. Arnold Constable & Company, department store owners, realized this advantage ten years ago, and its fleet of fifteen, the oldest in New York City, is still serving to the entire satisfaction of this reliable and conservative institution. This same company has on file performance records made ten years ago by trucks that are in active service today.

As the business grows the truck fleet grows to handle the increase in deliveries. Woodward & Lathrop, a Washington, D. C., department store, has ordered four more General Vehicle electrics, making a total installation of ten. Such orders are a proof of a continuance of good service.

Great credit must be given to the central station. In territories where lighting companies have been active there are now in use thousands of trucks, of which many are used by the central station companies themselves. The Cleveland Electric Illuminating Company is using a fleet of six Baker electric trucks, two of which are of two-ton capacity, and are used for general line construction work. They are both equipped with two sets of batteries and are kept running day and night a good part of the time.

They operate over a radius of thirty or thirty-five miles in and around Cleveland, over all kinds of paved and improved roads, and in all kinds of weather. They have been overloaded almost continuously, carrying two construction gangs with full equipment for line work, such as transformers, wires, tools, etc. They have received little mechanical attention in two years of continuous service in eleven months during the year 1912, both of these trucks operated every working day and eighteen Sundays. This is of particular interest because of the fact that the trucks are operated by former teamsters. The four smaller trucks are of five hundred pound capacity and are used as service runabouts.

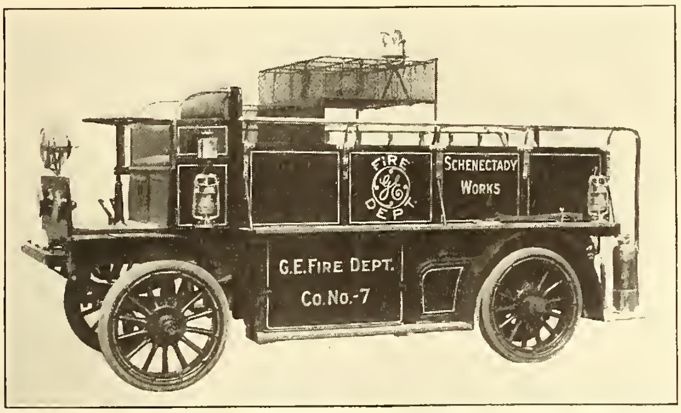
The Northern Ohio Traction and Light Company, Akron, Ohio, has purchased from the Baker Motor Vehicle Company a tower wagon, a one-ton and a two-ton line truck, the same to replace two two-horse wagons. The railway company expects the trucks to take care of all new construction for some time to come, as they are not running to capacity even with the present double work. A single charge furnishes an operating radius of 65 miles over very hilly country, characteristic of Akron and its environs. The average daily run has been from 30 to 35 miles.

The equipment of each truck includes a battery of forty-two cells and a series wound motor having 300 per cent overload capacity. The tower wagon, equipped with a McCardell tower 12 feet by 5 feet, can be raised by means of the motor to 17 feet 9 inches. The tool boxes are so arranged that there is sufficient room to seat ten men. The trucks are charged from an exciter

Hammacher, Schlemmer and Company's Fleet of General Vehicle Electric Trucks.

dynamo in the power plant, thereby reducing the cost of the charging current to a small item.

The most striking success of the electric depends upon the ability of its active service to eliminate the horse and gasoline car. The Curtis Publishing Company of Philadelphia, has purchased nine vehicles from the Commercial Truck Company to replace all its horses and gasoline cars, which it claims have heretofore been an obstacle to obtaining good hauling service.



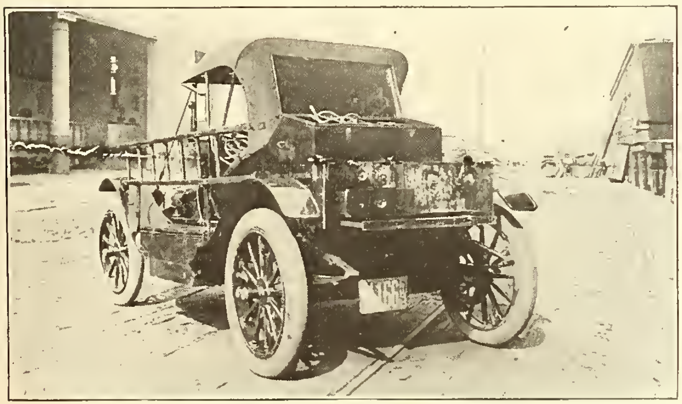
General Vehicle Electric Fire Patrol Belonging to the General Electric Company, Schenectady, N. Y.

The campaign to educate the business man has been fruitful. Though the entire campaign the electric and its service has been the only means of its own success. Just how great the success has been may be seen by the present standing of the electric throughout the country. Successful firms have accepted them and as a result they have solved the question of obtaining the best possible service in hauling and deliveries at a minimum of expense and attention.

Central Station's Emergency Wagon

The Cosmopolitan Electric Company of Chicago has installed an electric, purchased from the Bailey Electric Vehicle Company, and built especially to carry apparatus which is necessary to correct trouble throughout the districts supplied with its current.

This special vehicle is of the roadster type equipped with three boxes built as a part of the body, one placed on the left hand mud guard, another placed above the batteries on the front, and a larger one placed above the batteries in the rear.



The Emergency Truck, Showing Equipment.

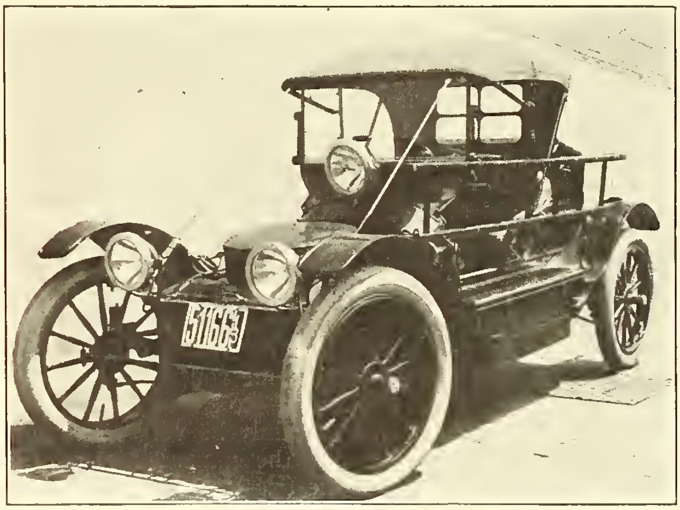
The case built into the mud guard carries a complete supply of rubber goods, such as boots, rubber mats, liniment, shields, gloves and insulation patches. The round box located on the front is built large enough to contain several coils of wire of different sizes, each adapted to a frequent type of trouble. The rear box contains the tools necessary in rendering assistance in any emergency, from setting up a new pole to splicing a cable. Lanterns, tape, fuses, torches, and solder complete the apparatus.

An extension ladder placed crosswise on the left hand side of the car can be detached for immediate use.

Probably one of the most necessary fixtures of the car is an exceedingly high power lamp, placed above the road lights, which, turning on a pivot, can be placed in any direction up or down. With the aid of this light, the poles and wires can be inspected at night without any difficulty.

The general weight of the car, equipped, is 3,200 pounds, allowing 500 pounds for the approximate weight of the tools.

The maximum speed obtainable is twenty-eight miles an hour, a 60-cell battery, which furnishes a charge sufficient to cover from fifteen to twenty-six miles. The light battery is used because the district never demands a run of more than fifteen miles.



Cosmopolitan Electric Company's Bailey Car.

This particular car is ready at all times and exclusively for emergency calls.

D. B. Rose of the Ohio electric agency in Sacramento, Cal., made a trip to San Jose a few days ago that again demonstrates the reliability and traveling radius of the electric of today. Rose had a delivery to make in the Garden City and decided that the easiest way was to drive the car down. Going across to Oakland, he drove to his destination by way of Hayward, Irvington and Mission San Jose. The total distance was forty-seven miles and the trip was made in 2 hours and 45 minutes.

"The interesting feature of the trip was that it was made without a stop," said Rose. "In test runs of this kind the car is usually stopped and the motor allowed to 'rest.' But in this case I went right through without a stop of any kind. In order to be sure of having plenty of juice left when I reached San Jose, I traveled at a steady pace of 16 miles an hour. Knowing what I do now of the battery power of the Ohio, I could readily make the trip a great deal faster."

The Proper Selling of Electric Cars

Paper Read at the New England Electric Vehicle Convention

BY LOUIS E. BURR

This paper advocates three developments with regard to selling electric cars. First, a reduction in the retail price of pleasure electrics; second, a better class of salesmanship for both pleasure and commercial classes; third, a closer co-operation of the manufacturers or their dealers with the central stations in furnishing service to the purchasers of electric cars. There is pointed out the desirability of making demonstrations in connection with soliciting sales of commercial cars. The salesmen should have more intimate knowledge of their own line of cars and the use to which they may be put than is now customary. A number of cases are cited wherein the purchasers of electric cors have been thrown upon the local central station for receiving service as regards inspection and repairs. The car manufacturer, the battery manufacturer, and the electric lighting companies are all deeply interested in the success of electric cars.

ABOUT the central station, what it wants to do and its ability to perform—I know very little; but I do know, of course, that the central station of today is very different from the central station of even a very short time ago.

About five years ago a Woods electric was driven overland from Chicago to Lincoln, Nebr., and about that same time another trip was made from Philadelphia to Pittsburgh over the mountains, both trips being considered quite remarkable at that time, on account of the fact that the journeys were negotiated by an electric car: During these journeys our men, who made the runs, were hampered and bothered a great deal about getting proper charging facilities and were obliged to resort to all kinds of methods and devices, known to the electrician, in order to charge the battery, even when they arived at a town where there was a central station. The central station manager was invariably courteous and ready to oblige, but was, as a rule, possessed absolutely of no knowledge regarding the method of charging an electric car.

I believe that should these same routes be followed at the present time, the conditions—so far as central stations are concerned—would certainly be very much improved, and it is my belief that the campaign of education, carried on through the Electric Vehicle Association, and in other ways, has awakened the central station to the great possibility of the electric vehicle business, as a source of profit to the central station. I would think that a central station that can afford to, would have an electric vehicle of some kind—either a commercial or pleasure vehicle—in its possession, for its daily use, in order to create a desire in the minds of the people in its district to own an electric vehicle, perhaps as much on account of the ease with which it can be cared for and charged as for any other reason.

It is a self-evident fact that the price at which current is furnished is a potent argument in favor of the machine and the price should be made as low as possible, consistent with the conditions. In other words, the closer the central station and the electric vehicle dealer can get together, the more business there will be for both and the greater the mutual advantage.

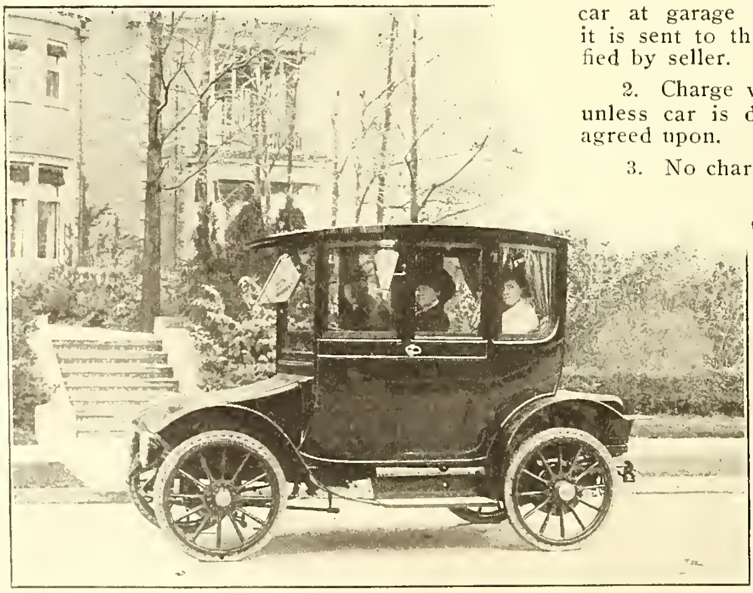
The question of service at the present time is, to my mind, a very important one. It is a very much abused word and may be compared with the so-called "guarantee" offered by a great many dealers. A guarantee means exactly what the guarantor intends it to mean—nothing more or less.

Service may be catalogued under the same head. Anyway, the average buyer of an electric pleasure vehicle has so many ideas offered to him in regard to promised service, that by the time he has completed his purchase he has service, guarantee and maintenance mixed up in one portion, with the firm conviction in his mind that all these things together mean—his car can be operated without cost to him, except the garage charges.

I am firmly convinced that it is necesary to adopt a standard service that can be offered to the prospective buyer as a standard service, so that he may know exactly what he may expect after he puts his car in operation.

I am pleased to say, unofficially, that the Electric Automobile Manufacturers' Association has this very question of service up for discussion and hopes within the next thirty days to offer to its members for adoption a standard service which will be, with possibly a few exceptions, as follows:

1. Free inspection once a month of car at garage or service station, provided it is sent to the station at the time specified by seller.
2. Charge will be made for this service unless car is delivered at station on day agreed upon.
3. No charge will be made for examining wiring, motor, controller, brakes, steering, running gear, or an examination of the battery to determine the time for washing or its general condition, as to whether it is being properly flushed and cared for. Nor will a charge be made for oiling the entire car; which, however, does not include repacking of bearings or gears in grease.
4. If inspection develops any needed repairs, due to natural wear, accidents or other causes, owner will be notified of same and an estimate of



A Spin in a Baker Coupe.

cost for doing the work furnished without charge to customer.

5. This service in no way eliminates the responsibility of the garage in which the car is kept.

If this standard service is adopted by the E. A. M. A.—and I believe it will be—it will establish a precedent for the honest salesman's use and it will eventually result in an actual profit to the honest agent, for the reason that as his business grows and more cars come in for inspection each month, repairs that can legitimately be charged for will be developed more and more, until the service proposition, which is now a misnomer and a nightmare, will actually become a source of profit to the seller, as well as a source of comfort to the buyer—to say nothing of the advantage it would mean to the average salesman.

There are other points regarding the service question that cannot be touched upon in this short address.

Taylor's Tell Tale

The tail light, as everyone that owns an automobile knows only too well, is probably the most important light on a car. Being "out" without the driver knowing it, often results in police interference and court fines.

The accompanying illustration shows a device designed to save such annoyance and unnecssary expense. Connected in circuit with the tail light, if the tail light burns out or refuses to shine, the "tell tale" on the dash lights up, thus informing the driver he is liable under the ordinance. It can be placed anywhere on the dash that is convenient, on either the front or the rear. The device is operated on from 60 to 80 volts on electrics.

Front and Rear Views of Taylor's Tell Tale.

The tell tale must be placed in a vertical position so that the arrow on the inside points upward, and so located that the operator can see it at all times.

The type adapted to electrics requires an eight-candlepower lamp or larger in the rear light to operate it, the signal light in the instrument being of any candle power.

Electric Car in Hurricane

Through one of the worst storms that has swept the District of Columbia in years, a Detroit electric made a surprising run of fifty miles cross-country over roads of various quality. Needless to say, this was made on one charge of the battery. In fact at the end of the ride, there was sufficient current remaining to run thirty or forty miles further.

Bruce Emerson, Howard Fisk and the editor of the Washington *Times* drove a four-passenger Detroit electric brougham out the Conduit road from Washington to Great Falls, thence to Potomac, Md.; Rockville, Norbeck, Wheaton, Kensington and Chevy Chase. In many places the roads are under repair, necessitating detours over rough places. The storm struck the tourists when they were midway between Norbeck and Wheaton, on the Seventh street pike. Falling trees stopped the progress of the machine and the motorists narrowly escaped injury when a large locust tree fell across the roadway just in front of the car. When the storm abated, Emerson and his passengers had to procure axes from farmhouses along the road to chop their way through the mass of trees that lay across the road for several miles.

In many places along the Seventh street pike the motorists found all the telephone wires down, falling trees having pulled the wires from the poles. Evidences of the fury of the storm were seen by the tourists in all the suburbs adjacent to Washington between Norbeck and Chevy Chase.

A long drive under conditions of this nature is a real achievement for an electric car and serves to demonstrate that the electric for both town and country service is a most practical vehicle.

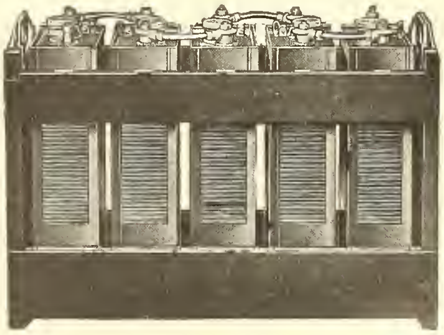
Anderson Company Secures Hanlon Patent.

Following many months of negotiating, the Anderson Electric Car Company has purchased outright the entire rights to the Hanlon patent for electric car windows. This invention, now controlled in America and abroad by the Anderson Company, is one desirable feature of the 1914 models of Detroit electrics.

The clear vision features of all Detroit electrics are even improved upon by this new method, which adds to the safety as well as to the luxury of driving the car. The invention protects occupants of the car in undesirable weather and at the same time enables the driver to see clearly ahead under all conditions. Adjustable from within, the operator may incline the front window at any angle desired and in the event of rain, snow or heavy dust, it may be closed from within in such a manner that the storm will not beat against the front glass. When closed in very cold weather, it is impossible for frost to form on the glass. These great advantages are readily apparent to the operator of any enclosed car who has had his view ahead impaired by such weather conditions.

A New Edison Cell

The Edison Storage Battery Company, of Lakeside avenue, Orange, N. J., has brought out a new type A15, nickel-iron alkaline cell. The A-5 battery has a rated capacity of 187½ ampere hours, intermediate between the type A-4, 150 ampere hours, and type A-6, 225 ampere hours. The new battery is designed for pleasure cars, for 1,000 pound delivery wagons, for industrial and baggage trucks, and for similar light work where the type A-6 has proved to be more than sufficient.



Five Type A-5 Edison Cells in Tray.

With the type A-5 Edison battery there is a "springiness" and feeling of power given to the control that is particularly pleasing to the operator. The Edison battery is not injured by occasional high rates of discharge so the driver may go the limit in emergencies with no fear of evil results. The Edison may be left "on charge" indefinitely and may even be put on charge in the reverse direction without harm. The container, grids, poles, etc., are all made of heavily nickel-plated steel and it is practically impossible to damage any part of the cell by falls, jars or collisions. The Edison A-5 battery, like the other Edison vehicle batteries, carries a guarantee that it will be capable of developing its full rated capacity at the end of four years. The general terms of this guarantee require simply that evaporation of the electolyte be replaced by distilled water to keep the plates covered, that every eight months or so the electrolyte—a solution of potassium hydrate with a little lithium hydrate—be renewed and that the cells be kept reasonably clean.

General Motors New Agencies

The following agents have recently been appointed by the General Motors Company of Pontiac, Mich., to handle its electric trucks:

Electric Garage Company, co-partnership Oestes Brothers, Fort Wayne, Ind., appointed dealers to handle GMC electric in Allen county, Ind.

American Hardware and Plumbing Company, New York City, has contracted for the sale of GMC electrics in the Philippine Islands.

The Carolina Coal & Ice Company of Asheville, N. C., has contracted for the sale of GMC electric trucks for the year 1914 in the county of Buncombe, N. C.

Galveston Motor Car Company, Galveston, Texas, contracted for the sale of GMC electric trucks, for the year 1914, in territory covering eleven counties in the state of Texas.

PERSONAL AND BUSINESS NOTES

At a directors' meeting, held July 9th the Baker Motor Vehicle Company of Cleveland advanced Mr. George H. Kelly from the position of manager of the truck department to the office of secretary and sales director. Mr. R. C. Norton, heretofore secretary and treasurer, will continue as treasurer. Mr. E. J. Bartlett becomes sales manager of the truck department, and Mr. O. B. Henderson continues as sales manager of the pleasure car department.

The election of Mr. Kelly as secretary comes after his splendid success in developing the truck department of the Baker Company. Established scarcely more than two years ago, this department has the enviable record of placing trucks not only in every section of the United States, but across both the Atlantic and Pacific; in the cities of Europe, Africa, Japan, South America and Alaska.

In giving Mr. Kelly the additional office of sales director, it has been the purpose of the Baker Company to correlate the sales policies of its pleasure car and truck departments under one managing head, so that in their co-operative work with dealers and customers the two departments may be brought closer together and go forward on a mutually strengthened basis.

H. E. Wagner has severed his connection with the Buffalo Electric Vehicle Company to take a similar position with the Nordyke & Marmon Company of Indianapolis.

John T. Steel, who has been in charge of the affairs of the Buffalo Electric Vehicle Company since January 1, has not yet announced who will succeed Mr. Wagner.

William G. Bee, who has been connected with Thomas A. Edison for the past eleven years, has been elected vice-president and general sales manager of the Edison Storage Battery Company, Orange, New Jersey. Mr. Bee entered the electric vehicle industry at its earliest commercial stage, going with Col. Pope of the Pope Manufacturing Company, afterwards the Electric Vehicle Company of Hartford, in 1897. At the opening of the Spanish War Mr. Bee was among the first to volunteer and served as chief gunner's mate on the U. S. S. "Gloucester," J. P. Morgan's yacht Corsair. Returning to the Pope Company after the war Mr. Bee spent a year in Mexico in its interests and was in charge of its exhibit at the Pan American Exposition. While with the Pope Company Mr. Bee gave Mr. Edison his first ride in an electric vehicle, his first automobile experience. Since the perfection of the new Edison alkaline nickel-iron storage battery a few years ago Mr. Bee has directed the sales policy of the company, which has already supplied one-third the storage batteries at present in electric truck service with similar remarkable advances in pleasure cars, railway train lighting, signaling, house lighting, ignition and other applications. "Billy" Bee is one of the best known and best liked members of the electric vehicle fraternity and his many friends in both the electric and gas fields are congratulating him on the substantial recognition of his work evidenced by his recent election.

Mr. Draime, manager of the Peerless Rubber & Tire Company, Toledo, Ohio, has recently taken the agency for Motz Tires in that territory. This new agency will be complete in every respect in order that Mr. Draime can give the best of service. A complete stock of tires will be carried and adjustments will be made promptly and satisfactorily.

W. G. Pancoast, sales manager of the Rauch & Lang Carriage Company, left Saturday, August 16, for a ten days' trip through the Middle West.

O. E. Stoll, formerly assistant sales manager of the General Motors Truck Company, home office, in Pontiac, Mich., has been appointed manager of the company's Philadelphia branch, with headquarters at No. 664 Broad street.

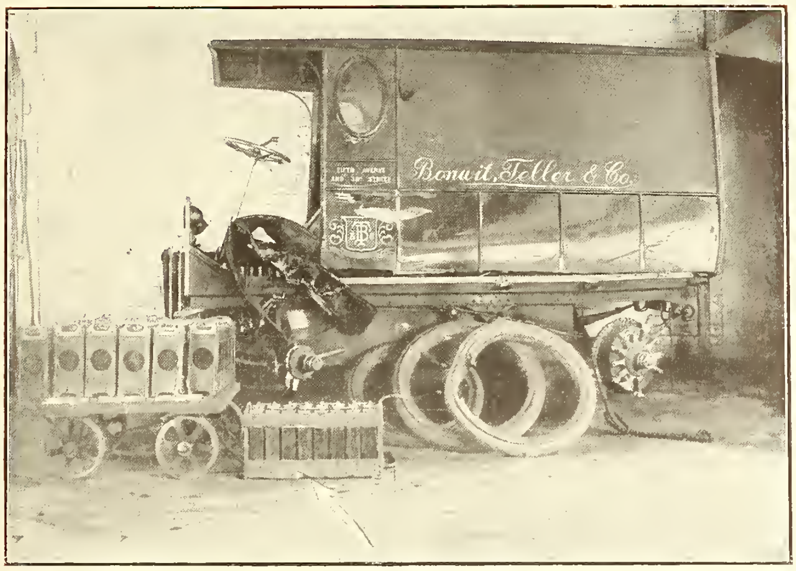
The Baker electric agency at 137 Oneida street, Milwaukee, Wis., is now ready to take care of all business. This concern is a branch of the Ralph Temple Auto Company of Chicago, which has handled Baker electrics for the last five years. Ralph Penn is the manager for the Milwaukee branch. He has been sales manager of his home company for some time and he believes that Milwaukee is a splendid field for Baker electrics. Mr. Penn believes that Baker qualities will appeal to the people of Milwaukee, especially, and he is very anxious that all Baker owners make the new store their headquarters for supplies and service.

The Metzger-Herrington Argo Company, distributer of Argo electrics, has opened a service station at Bland's garage, Chicago, for the care of Argo electric customers and it is in charge of L. H. Worne. Demonstrations will be made to north shore patrons.

Thomas Huss, vice-president and general manager of the Argo Electric Car Company of Saginaw, Mich., was in Chicago a few days ago visiting the Metzger-Herrington Company, national distributers of the Argo.

Peter Willis, advertising manager of the National Motor Car Company of Indianapolis, was in Chicago on a short and fast business trip recently.

E. J. Riedy, who has been associated with the electric business for some time, has been appointed selling representative of the Chicago Electric Motor Car Company in Evanston, Ill. Mr. Riedy has been with the Chicago Electric Company for only a short time, but has made an excellent record.



The arrow shows the only damage to the Edison Equipment—a split bottom slat in getting one tray out of the wrecked wagon.

THE BROADWAY CAR

WAS THE "BEST MAN"—AND PROVED IT

The "Detroit" Delivery Wagon was jammed between the car and the boulevard fence and curb at 111th St., New York.

It smashed the wagon and it bent the fence

BUT THE EDISON STORAGE BATTERY WAS UNINJURED

One good point about the Edison Alkaline, Nickel-Iron Storage Battery is that the container, grids, poles, etc., are all made of nickel-plated steel. Collisions, falls or continued service bumps of the hardest kind don't harm it. There are a lot of other good points described in Bulletin 1015. It's worth reading and yours for a postal.

EDISON STORAGE BATTERY CO.
170 Lakeside Ave., Orange, N. J.

Business Promotion Through Trade Press Efficiency

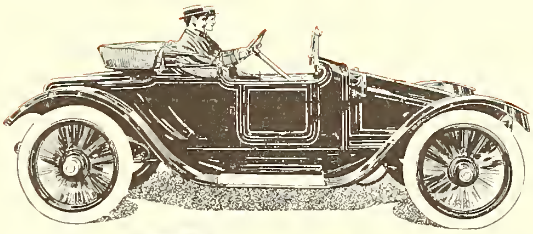
is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

Eighth Annual Convention of the Federation of Trade Press Associations in the United States at the Hotel Astor, New York, Sept. 18, 19, 20, 1913

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandising methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from
The Committee of Arrangements
WM. H. UKERS, Chairman, 79 Wall Street, New York

The Federation of Trade Press Associations in the United States
A. M. Swetland, *Pres.*, New York E. C. Hole, *V. P.*, Chicago
Edwin C. Johnston, *Secy.-Treas.*, New York



The Borland Electric

Business and professional men particularly appreciate the snappy, rakish lines of this Electric Roadster. Its comfort, simplicity and ease of operation appeal to women who like to drive.

The Borland Electric has all the best features, "Exide" batteries; automatic power cut-out when emergency brake is applied: easy horizontal control, etc. Made in five popular models—Coupe $2900, Roadster $2550.

Ride in the Borland Roadster and be convinced.

Our new Borland Poster Book will be sent upon request

The Borland-Grannis Co.
Chicago Salesrooms, 2634 Michigan Avenue
Factory 310 East Huron Street Chicago, Illinois

EMC
ESTABLISHED 1907
PUBLISHER
TECHNICAL MAGAZINES
AND TECHNICAL BOOKS

ELECTRIC VEHICLES

Vol. 3 CHICAGO, SEPTEMBER, 1913 No. 9

RAUCH AND LANG CLEAR VISION BROUGHAM

Common Sense vs. Vanity!

¶ *The Privilege of reaching the eyes of electric vehicle buyers and manufacturers through a favorite journal is inestimable. If advertising be a game of skill with just enough element of chance to give it zest, then the game of reaching eyes like these bears the same relation to consumer-advertising that table-stakes or ceiling-limit does to a perfectly ladylike game of penny-ante.*

¶ *In the insane cry for quantity in circulation, the unthinking forget that the ten spot with ten times as many diamonds as the ace, is nevertheless several stages lower than the ace. Give me four aces and you can have all the other 216 spots in the deck, for the aces have the buying power.*

¶ *One advantage that the class journal has is that it gets behind the doors that shield the mighty of the earth from the importunities of salesmen, and finds its place on their desks, or in the quiet of their homes.*

Wasteful Automobile Advertising

¶ *If one-tenth of the money that the automobile manufacturers expend for advertising high priced pleasure cars in penny dailies and nickel weeklies that reach the masses were placed in a selected class journal that reaches men and women of influence and wealth, there would be less failures among automobile makers. Could they ask for more nearly 100% efficiency, for instance, than the subscription list of a representative electric automobile journal—every reader an owner, dealer, or prospective owner of autos or a customer?*

¶ *And if all the money that is absolutely thrown away in popular media by builders of freighters and delivery cars were placed in trade and technical journals read by the very men who buy such vehicles, advertising folly would have one sin less to answer for.*

Specialized Media for Specialized Things

¶ *It must be evident to any thinking man that the place to advertise commodities or appliances special to any given industry is in the publications that reach that industry and that such advertising, if well written, well displayed and persistently kept up, will not only effect the desired sales, but will build up a permanent good-will asset of inestimable value.*

¶ *In short, any man who wishes to influence the sale of a commodity or proposition that involves any considerable outlay, should give careful thought to the high average and tremendous aggregate buying power of the readers of the class journal that reaches the captains of industry, the employing class, the men who have the money to pay for anything that strikes their fancy.*

¶ *See to it that Electric Vehicles tops the list when you consider your nineteen-fourteen advertising appropriation.*

Published Monthly By
ELECTRICITY MAGAZINE CORPORATION
Monadnock Building
CHICAGO

Entered at Chicago Post Office as Second Class Mail Matter

ELECTRIC VEHICLES
WITH WHICH IS INCORPORATED IGNITION
TRADE MARK REGISTERED IN THE UNITED STATES PATENT OFFICE

SUBSCRIPTION PRICE
Domestic - $1.50
Canada - - $1.75
Foreign - - $2.00

FOR SALE AT ALL NEWS STANDS

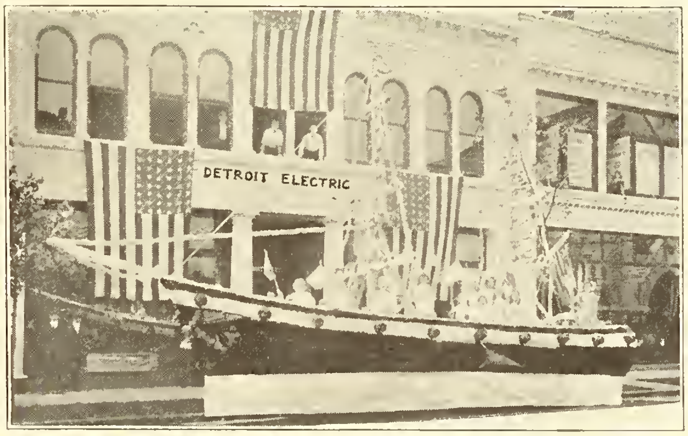
If Your News Dealer Will Not Supply You—Please Notify Us

Volume III CHICAGO, SEPTEMBER, 1913 Number 9

Perry Day Parade in Chicago

Electrics Make a Fine Showing in the Festivities

BY J. S. STEARNS

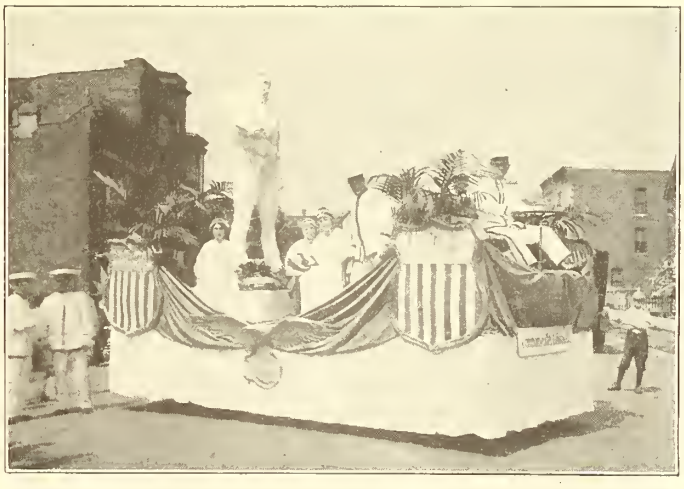


First Prize Winner—The Detroit Electric Float.

CHICAGO'S Oliver Hazard Perry Day parade on August 23 was a grand success. The electric fared extremely well. Manufacturers, users and prospective users had an opportunity to join in the spirit of the day as exemplified by floats built on electric trucks and pleasure cars. Much credit must be given to the Electric Vehicle Association's Chicago section for its successful effort in promoting an undertaking of this kind.

Practically all of the local dealers were entered, either represented by floats or with a great many of their latest model cars draped with bunting in the national colors.

A principal factor in making the event worthy of public attention was the enthusiasm displayed by the central station. A large float built on a three and a half ton General Vehicle truck, and containing a cast of Commodore Perry, around which were clustered many pretty girls dressed in white, was followed by a train of twenty-five trucks, each decorated and containing electrical devices in action, the power being supplied from the storage batteries of the truck. In consideration of such a splendid fleet, the Commonwealth Edison received first prize.



Another First Prize Winner—Commonwealth Edison Company's G. V. Float.

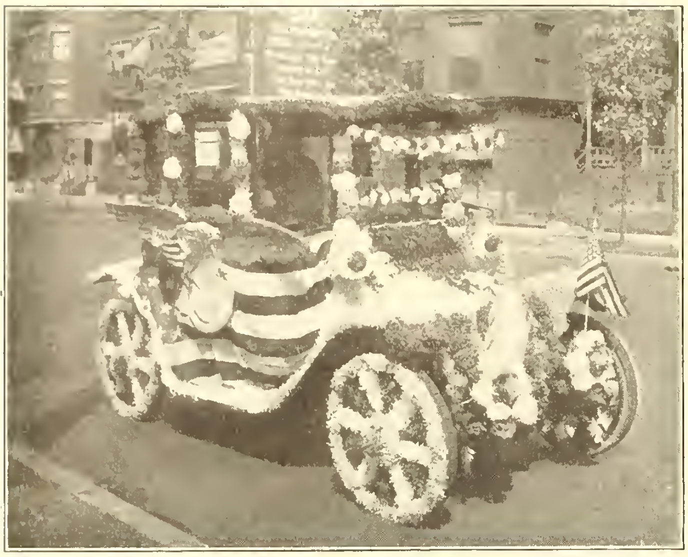
For the best decorated electric passenger car the Anderson Electric Car Company was awarded a prize. Built on a chassis of a "Detroit," the float was an exact imitation of Commodore Perry's flagship, the "Niagara." Forty feet long and decorated in flowers, the stately ship passed over the boulevards with its cargo of little children, each carrying an American flag. The masts were so constructed that they could be dipped in order to negotiate the overhead telephone wires. The beauty of such an appropriate float will be long remembered among the enthusiasts of the parade.

The Detroit was also awarded a trophy for having the greatest number of entries. The Anderson Electric Car Company claims a twofold honor in that this prize was won for the company by the efforts of Detroit owners who voluntarily decorated and entered their own cars in order to boost the product of which they are the proud possessors.

The second prize was awarded to the Chicago Electric with a 1913 model decorated in roses. The beauty of its lines and the effect produced by the flowers made a magnificent combination.

With twenty-eight Baker electric trucks, the American Express Company was awarded a trophy for having the greatest number of trucks entered from one firm. The American Express Company is one of the greatest firms in the express handling industry. Such co-operation on its part aids in educating business men to the acceptance of the electric vehicle as a method of rapid and reliable transportation.

The parade formed at Michigan avenue and Thirty-seventh street, the electric cars under the direct supervision of Richard Mansell of the Borland-Grannis Company. Due to the efforts of Mr. Mansell and his Borland roadster, the electrics were kept in line properly at all times. After having passed through the boulevard system the entire procession entered Grant Park and before the judges' stand, where the prizes were awarded. Many spectators congregated in the districts through which the parade passed, and the general interest displayed was an indication of the success of the day.



The Chicago Electric's Decorated Car.

Trips Around Portland, Oregon

While Portland, Ore., is admitted to be the best city pro rata as a motor truck center, and by its residents, in the majority of cases the best without any qualifications at all, it is admitted to be by no means the best as an electric vehicle city.

Various reasons have been assigned from time to time for this, none of them convincing, many of them absurd. It would seem to be just a case similar to conditions in other cities, where some will be either a Ford city or a Studebaker, a Buick or an Overland, in the cheaper class of cars, using a general definition of the word cheaper.

Rerhaps the best reason for the proportional paucity of electrics in Portland is due to the fact that there seems to be a prevailing impression that electric cars are made and meant only for perambulating the streets, for taking small shopping jaunts or for traveling from one's house to the theater and back. Frequently an amazing ignorance is shown as to the distance that these cars will travel without having the batteries recharged.

For that reason, if for no other, a trip taken recently by Mrs. Tyler Watson and some friends is interesting and at the same time instructive. Mrs. Watson is a great believer in electrics, not merely on account of their peculiar adaptability for women but because she has taken quite a number of lengthy trips in them. As an instance of the opinions some people have, it may be mentioned that a Portland woman said:

"I would have an electric tomorrow if I could only go for trips for instance that are told about every Sunday in the *Oregonian*."

So far not a single trip has been given which could not have been covered comfortably in an electric.

But to revert to the trip taken by Mrs. Watson. She recently went to the Automobile Club country house in her Detroit electric, accompanied by some friends. The trip was by regular route to the clubhouse, via Hawthorne avenue to the Base Line road with its miles of dead straight road until one comes to the right-hand turn shortly before reaching the clubhouse.

"It is on a trip of this description even better than in the streets of a city that the advantages of such a vehicle as the Detroit electric are illustrated," said Mrs. Watson. "The ease of control, the entire absence of any worry as to punctures or to gasoline shortage are more emphasized.

"Another important point is that there is no need to worry about the weather because the car is an enclosed one. With the ventilation so well looked after as it is in the later models of electrics, the enclosed car has more advantages today than ever in time past, and it is to me a marvel, a question I have always been unable to answer satisfactorily why more persons do not avail themselves of their electrics to make a trip, or buy electrics in the first place.

"Supposing that one has both an electric and a gasoline car, as is the case with many persons today, how frequently one hears them decide not to make a trip in the gasoline car because they are afraid of the weather. With the electric at their command, it never seems to strike them that they need not fear weather conditions."

The Detroit electric which Mrs. Watson uses is equipped with Edison batteries and is capable of making the trip to the clubhouse and back without the least need of recharging.

Detroit Electric Improvements for 1914

Detroit electric cars for the 1914 season will offer greater value than ever before and for less money. Increased production and efficient factory methods have made this possible. The 1914 line will be exceptionally comprehensive. It covers practically every type of vehicle that a buyer could desire. There will be two separate chasses—one a worm gear drive chassis and the other a bevel gear drive.

Three different body types will be furnished on the worm chassis, as follows:

A five-passenger duplex drive car which can be operated from either front or rear seat.

A four-passenger single drive car with wide roomy rear seat for three passengers, and a revolving chair in the front right-hand corner for the fourth passenger.

A roadster, an ideal gentleman's car.

On the bevel gear drive chassis three body types will be furnished:

A five-passenger forward drive car, operated from the front seat.

A four-passenger single drive car, driven from the rear seat, with a revolving chair in the front right-hand corner.

A Victoria, a luxurious open car.

Many improvements have been incorporated in the 1914 Detroit electrics. All will have larger battery capacity which means even greater mileage than in the past. All will be equipped with extra large tires (insuring easy riding, easy handling and low cost of upkeep for tires and car); electric brake operated from the controller handle; Hanlon patented rain vision front window; oval crowned fenders; Warner speedometer; high grade clock, together with many minor details in finish, upholstery and equipment.

The Fashion Garage and Charging Station

A Splendid Example of Modern Accommodations for Electrics

BY FRED B. SCHAFER

The Fashion Garage, Chicago's Big Electric Car Station.

EVERY industry has an epoch in the history of its development. That of the electric vehicle has been marked with a degree of success that now compels both the business man and the pleasure seeker to partake of its advantages. The advancing popularity of the electric has had its influence on the garage. Garagemen have awakened to the possibilities in the case of the electric vehicle as a profitable source of revenue. In the primitive days of the electric vehicle the garage was a minor factor in advancing this particular field of industry. However, garagemen soon began to appreciate the profitable business accruing from the charging and general garaging, and as a result the development of the garage has approximated the progress made by the vehicle, until at the present time we find some splendid examples of the exclusively electric garage.

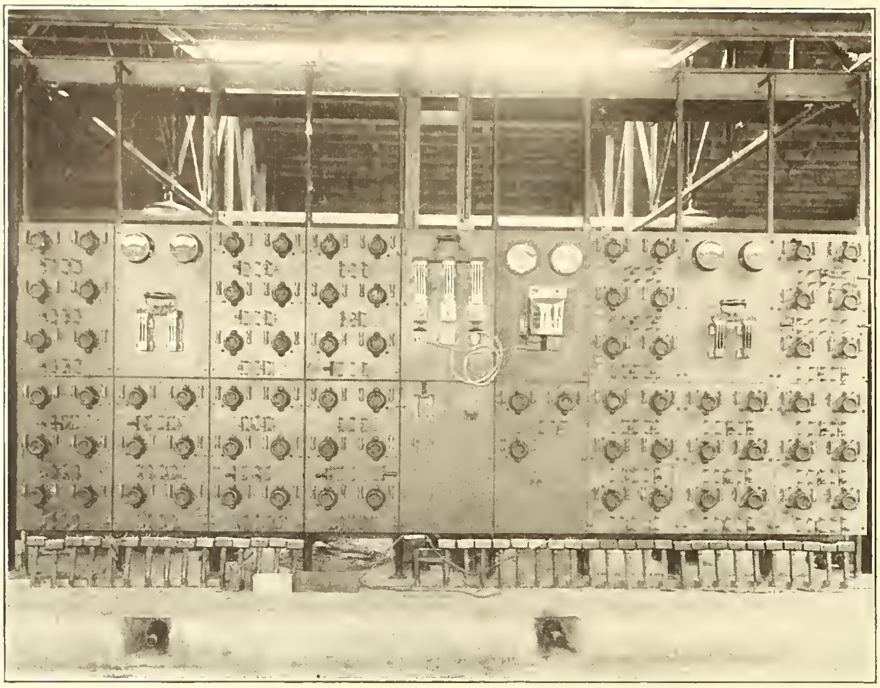
Probably the largest and most modernly equipped electric garage in existence at the present day is that of the Fashion Automobile Station. Located at Fifty-first street and Cottage Grove avenue, in the center of one of Chicago's most fashionable residential districts, the garage represents the latest ideas in construction and equipment in the proper caring for and charging of the electric vehicle.

Much attention was given to the construction of this structure. Built of ornamental brick, reinforced cement and a steel roof, the garage is absolutely fireproof. The building is one story high and comprises two wings, forming an L, the larger wing of which runs north and south facing Fifty-first street, and which measures 130 by 180 feet. This division is reserved exclusively for electrics. The smaller wing, measuring 50 by 180 feet and fronting on Cottage Grove avenue, is temporarily reserved for gas cars. However, due to the great number of cars handled each month, this sec-

General View of the Interior of the Fashion Garage.

tion also will shortly be used exclusively for electrics.

The station has a total area of 36,000 square feet of cement floor available for handling cars. Of this total area 23,400 square feet represents the area of the Fifty-first street section, which is divided into three bays by cement bumpers containing charging circuits. Embedding charging circuits in the bumpers as well as in the walls introduces a new point of interest, in that more circuits can be installed and consequently a greater number of cars can be charged at the same time. At present the station can charge 80 cars at one time. After October 1 the new equipment will allow an increase of forty more cars, making it possible to charge 120 cars at once. The charging circuits are run in conduit under the cement floor. The wiring for light and power is also run in conduit between the walls. Universal charging plugs of the Anderson type are used exclusively.



The Big Switchboard, Showing Charging Panels.

One of the most important features of the station is the introduction of a special direct current line extending from the Hyde Park substation of the Commonwealth Edison Company to the switchboard of the garage. This special connection is the only one of its kind used in Chicago in districts supplied with alternating current. The arrangement was suggested by Mr. Macrae, a battery expert of the Commonwealth Edison Company, who installed the service at the opening of the garage on May 1 of this year.

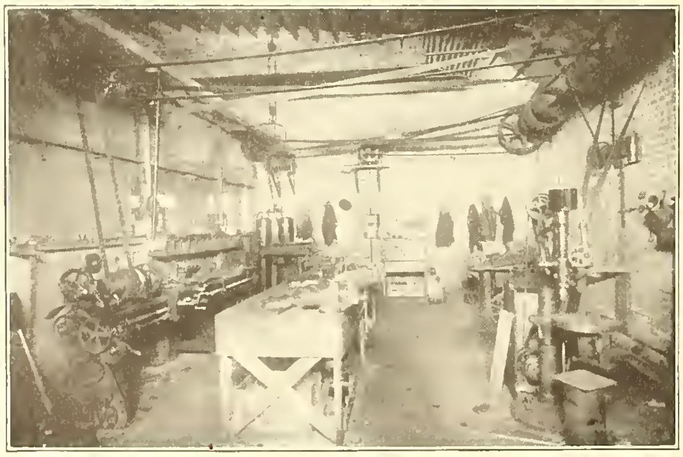
The owners agreed to pay for the installation and they have found that the direct current received by means of their generator not only does away with rectifiers, but also decreases considerably the expense of the current consumed. The location of the substation directly across the street allows this arrangement.

A model switchboard of nine panels located in the center of the room is accessible from any location. There are eight charging panels, each equipped with new type carbon-compression rheostats made by the Allen-Bradley Company of Milwaukee. The resistance in these rheostats is secured through the imperfect contact between the surfaces of prepared graphite disks, piled in a column. This contact resistance varies with pressure, and the resistance changes are caused by subjecting the column to various degrees of pressure. The columns of disks are enclosed within an insulated steel tube, which is provided with suitable terminals and plungers for transmitting the pressure to the disks. As the resistance of these rheostats is not varied by cutting in and out resistance units by means of a contact arm and segments, but is dependent upon the pressure applied, the current may be set exactly at any desired value, regardless of the number of cells being charged, and may be raised gradually.

The center panel of the switchboard is equipped with main line switches and a watt-hour meter for measuring the energy used. A Printometer is also installed for furnishing a printed record of the energy used at specified time intervals, this record being used by the Commonwealth Edison Company in ascertaining the time of maximum demand.

One of the most noticeable features of interest in the laying out of the station is its excellent illumination, due to the forethought in arranging facilities for securing the best possible lighting effects. Natural light is obtained successfully by means of skylights built in the roof at successive intervals, which afford a sufficient natural illumination during the day. The electric lighting system is worthy of particular attention, as it closely follows the most exacting specifications for illumination of this class of interior. A total of one hundred 150-watt tungsten filament lamps equipped with white enameled steel reflectors are suspended from the arches in the ceiling and spaced uniformly so as to give well distributed light over all parts of the building. Localized lighting is unnecessary in any part of the main charging room.

In addition to the larger sections, the garage has a battery room located in the extreme north end, and also a machine and trim shop located in the northeast corner of the Fifty-first street section.



In the Machine Shop.

The battery room is in charge of two experts who are constantly employed in making inspections and repairing. There is installed an automatic water distilling plant which furnishes a sufficient supply for filling and flushing batteries.

The machine and trim shop is supplied with a modern equipment of lathes, drills, shaper, emery wheels, etc., all of which are driven by a five-horsepower motor. The amount of work on repairs keeps seven skilled mechanics and two upholstery trimmers employed constantly.

In connection with the machine shop the station has established a paint shop with two painters in charge. A shower bath has been installed especially for the employes of the shops.

The station maintains a thorough equipment of automatic sprinklers and vacuum cleaners for washing cars. The cars are washed where they stand, hot and cold water being available at any time. Three washers are employed as a night shift.

The entire station is heated by steam, which is generated in the boiler room just off the machine shop. Series of pipes, attached to the ceiling, carry the steam throughout the building and radiate a sufficient amount of heat to keep an even temperature for the protection of the cars.

A Corner of the Battery Room.

To insure the proper supervision of such a large outfit, the management has provided both a day and a night manager, or superintendent, with an office located near the entrance. With the help of two floor assistants and ten delivery men, the company has little difficulty in making calls and delivering customers' cars in answer to telephone requests. As each car leaves the garage it is given a thorough inspection by an inspector stationed at the door. As service is the commodity sold, no detail is overlooked in giving the cars the best possible attention, which is no doubt one of the principal factors that has brought about the success of such an undertaking.

The Good Roads Movement

With 10,000 miles of his 17,000-mile automobile journey behind him, A. L. Westgard, vice-president of the National Highways Association, and director of trans-continental highways, has left Denver for Albuquerque, N. M., via Colorado Springs, Trinidad, Las Vegas and Santa Fe.

From Albuquerque he goes westward to Los Angeles, arriving there early in October, and examining some of the roads of southern California before turning his face eastward on the return journey across the continent. On the way to New York his route will take him through parts of Arizona, New Mexica, Texas, Arkansas, Mississippi, Tennessee, North Carolina, South Carolina, Georgia, Florida, Virginia, Maryland, Delaware, Pennsylvania and New Jersey.

Since parting company with the Indiana tourists at San Francisco, at the end of the Indiana-to-the-Coast tour, six weeks ago, Mr. Westgard has traveled more than 3,000 miles in the northwestern states. He reached Denver by way of Boise, Idaho; Ogden and Salt Lake City, Utah; Meeker, Rifle, Glenwood Springs, Leadville, Tennessee Pass and Colorado Springs, Colorado. Governor Spry of Utah rode with Mr. Westgard from Salt Lake City to the Colorado line. At Meeker the National Highways Association's pathfinder was met by Governor Ammons of Colorado for the ride to Denver. Both governors are members of the association's council of governors, which includes 50 chief executives of the states, territories and dependencies of the United States—more than have been identified with any similar movement in the history of the country.

Throughout his long journey Mr. Westgard has met with the utmost cordiality and hospitality. Boards of trade, chambers of commerce, good roads organizations, automobile clubs have alike honored him, and intense enthusiasm has been aroused in the work that he is doing—the collecting of first-hand information about road conditions,—and in the plan of the National Highways Association. This advocates, as supplementary to the present system of townships, county, and state roads, a system of 50,000 miles of national highways to be built and maintained by the national government, in order to foster the development of good roads everywhere.

The entire expense of Mr. Westgard's tour is being borne by the association. No commercial interests are involved in it.

Electric Touring in Arkansas

Country jaunts in an electric, accomplishments that factory and publicity men promote for broadcast advertising in other states, have been enjoyed several times within recent weeks by Miss Leonora Rice, 2214 Arch street, Little Rock, Ark., in her Woods car.

Without mentioning her accomplishments to anyone other than a few friends who happened to learn of them, Miss Rice has been duplicating the feats of factory men, and establishing precedents for Little Rock and Arkansas.

Several days ago, while driving about the city streets, the monotony prompted a "back to nature call." The sturdy little car was turned northward over the river, thence east down the country road. Galloway was reached before the turn was made and when Miss Rice reached her home in the evening she had driven more than 40 miles, with the greater part of the distance in the country, over roads, at best, incomparable to smooth pavements, the usual haunts of electric vehicles.

The first jaunt proved so pleasant that a later one to Scott's was made, then the out-of-town rides became more frequent, and now the round trip to Sweet Home is made by Miss Rice several times each week.

Miss Rice has driven the car but two months and has totaled 1,800 miles, at an average of 75 to 100 miles on each battery charge.

Preparations for the Big Annual Convention

How the Committees are Working for the Success of October's Event

BY W. J. McDOWELL

Hotel La Salle, Chicago, Where the Convention Will Be Held.

TO every convention there is attached much preparation and excitement, not only on the part of the committeemen, but also with the great number of electric vehicle manufacturers, users, and prospective users, who await the time when business cares can be put aside for the more delightful fancies of the general good fellowship which hovers over the banquet table. The happy thought of again meeting that eastern friend of last year's convention, and the opportunity of making new acquaintances, seems to wile away the thought of the heavy grip.

Munificence of jollity and the notes of the cabaret penetrating through the thick smoke of convention cigars tend to produce that unexcelled atmosphere predominant in convention circles. Competition ceases temporarily; in fact, one might call such a gathering a happy family intended to improve the industry.

At the Electric Vehicle Association convention in Chicago, October 27 and 28, representatives from every electric vehicle manufacturer are expected to be present, in order to take in a grand opportunity of "boosting" the electric truck and passenger car. The eighteenth floor of the La Salle Hotel will be devoted to exhibitions and headquarters rooms, individual rooms acting as the headquarters of some of the vehicle and accessories manufacturers.

Suggestions have been proffered, and will probably be carried out, to the effect that those companies having individual headquarters will have in supply an abundance of fresh cigars and also literature which will interest the users and prospective users.

Friendly chats from the big men in the game, the men who know, and the opportunity for personal interviews and exhibitions will aid in entertaining association members and friends.

Monday morning, October 27, will be devoted to registration. The cost of registration will probably be fifty cents or a dollar. A luncheon will be given Monday noon, probably by the courtesy of the central stations in Chicago and its territory. Special interest should be taken in appreciation of the efforts of the central station to promote the situation.

Monday afternoon, at 2 o'clock, formal sessions will commence. At 6 o'clock that evening there will be a dinner at the hotel, followed by an automobile trip to the Fashion Garage, 51st street and Cottage Grove avenue, where some of the electric passenger car manufacturers will have their machines on exhibition and some of the manufacturers of batteries, charging apparatus and various other accessories will have their product on exhibition. At the present time it is not known whether the truck manufacturers will have any of their trucks on exhibition, but it is expected that they will have their machines on view at the garage. The party will then go back to the La Salle Hotel for a smoker and cabaret show.

Tuesday morning and afternoon will be devoted to formal business, and Tuesday noon the Chicago section will have their regular luncheon, to which all out of town visitors and all those attending the convention will be invited.

The papers committees are arranging nine papers, three to be read at each of the three meetings. From responses now coming in, it is very certain that these will be the most valuable papers that have ever been presented at a convention of this kind. While it is hard to tell what the attendance will be, it is expected that there will be approximately 300 delegates in attendance.

Now is the time for every member of the association to prepare to be present at the convention. It is the fourth annual convention and let us make it the best. The industry is rapidly advancing and such opportunities as a national convention allow representatives from all over the country to get together and to discuss and plan methods of advancing the industry in this particular field.

The following comprise the convention committee already working hard for the success and popularity of the event:

Homer E. Niesz, *chairman,* Cosmopolitan Electric Company, Chicago.

D. C. Arlington, Philadelphia Storage Battery Company, Chicago.

G. H. Atkin, Electric Storage Battery Company, Chicago.

Day Baker, General Vehicle Company, Boston, Mass.

W. G. Bee, Edison Storage Battery Company, Orange, N. J.

W. H. Blood, Jr., Stone & Webster, Boston, Mass.

Charles Blizard, Electric Storage Battery Company, Philadelphia, Pa.

L. E. Burr, Woods Motor Vehicle Co., Chicago.

Hayden Eames, Cleveland, Ohio.

L. A. Ferguson, Commonwealth Edison Company, Chicago.

C. B. Frayer, Edison Storage Battery Co., Chicago.

W. W. Freeman, Alabama Power Company, Birmingham, Ala.

John F. Gilchrist, Commonwealth Edison Company, Chicago.

Uri Grannis, Borland-Grannis Company, Chicago.

James T. Hutchins, Rochester Railway & Light Company, Rochester, N. Y.

George H. Jones, Commonwealth Edison Company, Chicago.

G. H. Kelly, Baker Motor Vehicle Company, Cleveland, Ohio.

W. P. Kennedy, New York City.

E. W. Lloyd, Commonwealth Edison Company, Chicago.

E. S. Mansfield, Edison Electric Illuminating Company of Boston, Boston, Mass.

Harvey Robinson, New York Edison Company, New York City.

William L. Rudd, Wm. L. Rudd & Company, Chicago.

P. H. Schaffner, Manhattan Brewing Company, Chicago.

Frank W. Smith, United Electric Light & Power Company, New York City.

F. M. Tait, Dayton Power & Light Company, Dayton, Ohio.

L. E. Wagner, Baker Motor Vehicle Company, Chicago.

P. C. Wagoner, General Vehicle Company, Long Island City, N. Y.

Arthur Williams, New York Edison Company, New York City.

E. E. Witherby, General Vehicle Company, Chicago.

W. J. MacDowell, *secretary*, General Vehicle Company, Chicago.

The sub-committees have been appointed as follows:

Finance Committee—George H. Jones, chairman; Uri B. Grannis; G. H. Atkin, E. E. Witherby, and Harry N. Fowler.

Entertainment Committee—L. E. Wagner, chairman; C. B. Frayer, and P. H. Schaffner.

Exhibits Committee—E. E. Witherby, chairman; G. A. Freeman, and Thomas W. Barnes.

Transportation and Garage Exhibition Committee—L. E. Burr, chairman; D. E. Whipple; Ralph Temple; Harry Salvat, and Penrose Reed.

An Old Truck

The history of the electric commercial vehicle really commenced in 1899, when the old Columbia Vehicle Company, of Hartford, sold a five-ton electric truck to the Central Brewing Company, of New York City. This truck, now fourteen years old, is still in daily use and is said to cost less than a hundred dollars a year to maintain. In the period between 1895 and 1908 electric pleasure and commercial cars became very popular, but due to poor mechanical design and inferior batteries the business so quickly gained was rapidly lost, and from then until 1911 further development was very slow. The real successful electric truck and pleasure car actually dates from the spring of 1911.

An Argo Emergency Truck

The city of Alliance, Ohio, purchased last year from the Argo Company a combination ambulance and patrol, which has been in active service for fifteen months.

The truck, 3,600 pounds in weight, is mounted on a special spring suspension. Exceedingly resilient full-elliptic springs and Motz cushion tires are used in order to insure the occupant from road shocks.

The interior contains two leather cushioned folding seats, one of which contains a modern hospital stretcher. This stretcher, when suspended from four spiral springs fastened to the ceiling, is absolutely insulated from any possible jar or road shock. After removing the stretcher the seats can be caused to collapse.

Heavy leather curtains, when drawn down from the top, completely cover the heavy wire grating and form an enclosure protected from excessive noise and weather conditions. Equipped with bed clothing and an emergency medicine chest, the car has the best obtainable facilities of a modern ambulance.

Sixty-four A-6 Edison storage cells are used, giving an average speed of twenty miles an hour. The service of the truck has never been interrupted by the necessity of a repair.

An Argo Police Ambulance and Patrol.

The city authorities claim that the truck is well adapted to this field and its great success is due to the important features of ever-readiness and reliability which the truck offers in cases of emergency.

Park Garage Plan Doomed

A plan for an open air garage in Grant park proposed by the Electric Vehicle Manufacturers' Association, Chicago section, appeared doomed to defeat at the hands of the South Park Commission. The proposition has been scheduled for a final decision at the next meeting of the commission, a week hence.

Those who have expressed themselves against the proposition are John Barton Payne, head of the commission; Joseph Donnersberger and C. L. Hutchinson. Albert Mohr and Edward Tilden have not given their views.

"I do not see how the commission would have the right to give out a private concession in the public park," said Mr. Donnersberger. "There is no more reason why we should furnish a garage or parking space for automobiles than there is that we should establish a stable for the convenience of truck drivers. No city in the world furnishes a public garage."

Electrics, the Modern Conveyance

Of all modern inventions the electric automobile is probably the least investigated and the least understood by the average family. The common idea of an electric is that it is made expressly for society women and their social calls, and to be used only on city pavement. Nothing could be further from the actual facts, as witnessed by the number of electric cars in operation and the use made of them. It is true that the luxurious new electric, which sells for $3,000 or more, is looked upon much as is a string of pearls or a private yacht. But there are hundreds of electric cars owned and operated by people in such states as Kansas and Oklahoma, and every owner will testify that "next to the home there is no investment that will give more real pleasure, comfort and convenience to all the family than an electric runabout or brougham."

The machine parts of an electric are very simple and very durable. The different parts are the battery, which is usually installed under hoods in the front and back of the car, the electric motor, and the controller, which changes the electrical connections between the battery and the motor. The simple operation of the controller lever admits more or less electricity from the battery to the motor, thereby changing the speed of the motor and of the car. Trouble in the motor and controller is practically unheard of. The wheels and all moving parts run on enclosed ball bearings which last indefinitely. The tires and the battery are the only parts to wear out. On account of sensible speeds of from five to twenty-five miles per hour, the tires last much longer than they do on gasoline cars. A great many electrics are equipped with solid rubber tires that run from ten to twenty thousand miles without replacement, and eliminate all tire troubles.

The common lead battery will run the car from ten to twenty thousand miles without need of replacement. New lead batteries will cost from $150 to $300, depending upon size. The new Edison battery costs about four times as much as the lead battery, but is claimed to last a lifetime. The batteries are strong enough to run the average car eighty or ninety miles on average city streets for each charge of the battery. Average country roads take from ten to twenty per cent more electricity than city streets, so that the electric car is entirely practical for any city or town in the Southwest where electricity is available. Direct current is used to charge the battery. In cities where alternating current is used it is necessary to change this to direct current by means of a "rectifier." This may be installed either in public or private garages. The usual expense of charging the battery is from 60 cents to $1.00.

On account of the long life of the electric car many people take advantage of low prices on second hand cars. With new battery and new tires these prices are usually about one-third that of a new car. Except for changes in styles, the old electric is as good and serviceable as a new one.

Concrete Roads Urged Instead of Macadam

Waterbound macadam roads which for practically a century have been adequate for the traffic have now, under the new conditions, become obsolete, and their further construction means a serious waste of public funds, is of the opinion of former President Lewis R. Speare of the American Automobile Association.

Macadam may answer for side roads and cross roads where there is little travel to wear the surface into dust, and few fast moving vehicles to throw the dust into the air to be blown away. But for the main roads anywhere and everywhere a method of construction must be put in operation which will produce durable roads.

Wherever it can be used concrete makes a most excellent road, or a road base for some other kind of surface. The State of California has adopted concrete construction for practically its entire system of state highways, after a most thorough investigation. Wayne county, Michigan, has been building concrete roads for the past five years, and they have given most excellent satisfaction.

Before the Wayne county authorities had learned by experience how to build concrete roads with expansion joints to prevent the concrete from cracking in cold weather and buckling in the hot sun, several miles of roads were built which broke into frequent cracks. To repair these cracked sections of road they poured hot bituminous material into the cracks and covered them with sand. This has worn to the level of the concrete, and the whole forms a most delightfully smooth road to travel over, and one which looks as if it would stand for a generation at least.

In some sections of the country the concrete is being used as a base, and two or three inches of broken stone, mixed with bituminous materials, put on for a surface. If properly built this kind of road should be very durable, and should justify the additional expense. The concrete will furnish the strength required to hold up the loads which are constantly growing heavier, while the bitumenized surface will prevent the creation of dust, making the road pleasant to travel over.

The only proper way to figure on the cost of a road is to consider both the original cost and the expense of maintenance for a period of ten or fifteen years. Under present conditions of travel a macadam road would have to be resurfaced every two or three years, and would be in bad condition two-thirds of the time. The aggregate cost would be far greater than that of a concrete road with a bituminous surface and the latter would present a good road all the time.

Why Electrics Are Popular Nowadays

Ivan de Jongh, general manager of the Pioneer Motor Truck Corporation of San Francisco, tells why electric cars are popular. He says:

"Anyone can drive an electric. Every day you see women driving electric coupes without strain or effort. Few women have mechanical knowledge. It is a matter of instinct rather than thought. And electric driving is safe driving. The kind that adapts itself to your delivery problems and to your present drivers.

"It is as easy to drive a six-ton G. M. C. electric as an ordinary touring car, and the brain strain isn't there. This is an age of hurry but not of haste. Everyone in business must give service, not only as good but if possible a little better and a little quicker than his competitor. You must lay the goods down quickly, not alone to effect a saving for yourself but to satisfy your customer. Every minute clipped off the time required for making a delivery or every penny saved means that you add to your business and to your profits. The motor truck makes this elimination of time possible and the more serviceable the truck the more steadily it remains in service, the greater your saving becomes."

Touring Over Northern Illinois Roads

A Run in an Argo Roadster Through a Hundred Miles of Scenery

BY E. L. MONTAGUE

MUCH attention is centered in the electric vehicle's ability to negotiate conditions and distances which seem to be entirely beyond the claimed capacities. Indeed, accomplishments of this nature known to the manufacturers are not always made public. These results have been attained by experienced men under the best of conditions, and the published records might lead to a misconception of the car's guarantee. However good the reasons may be for handling this subject with care, still there is a demand from the prospective owner for information on this subject which if satisfied will result in the advancement of the industry.

One of the most convincing accounts of the electric on a long trip is cited in a run made by M. R. Schumway of Rockford, Ill. Mr. Schumway has been the possessor of an Argo roadster for fifteen months, and during this time he has had occasion to make a number of long trips. In each case he found it possible to go and return without the least anxiety as to the necessity of a recharge. After a number of such trips he decided upon making a test as to the greatest possible distance which he could cover in his his year old roadster. As a result, on Sunday, June 29, this year, Mr. Schumway left his home to ascertain positively how much mileage he could obtain on a single charge over an unselected road course. In the early morning, about seven o'clock, the roadster started on its run over the Second street road, passing through the villages of Roscoe and Rockton, past the old fair grounds, and arrived at Beloit at nine o'clock. After a short drive through the principal thoroughfares of Beloit, the roadster retraced its route over the same roads on its way back to Rockford, the course lying on the east side of the Rock river. The view obtainable from the road has the reputation of being unsurpassed in that section of the country. Upon reentering Rockford, Mr. Schumway crossed the river at State street, turning north on Main street. Main street leads directly into a very beautiful country situated along the banks of the river. Rockford's amusement park, known as Harlem park, and the Rockford Country Club were passed as the roadster continued its trip to the north. Mr. Schumway mentions the encouraging condition of the hard macadam roads in this particular vicinity. The hillside has a great many landmarks and in one case especially a large, capacious country house stands prominently on the crest of a hill overlooking the entire Rock River valley.

Mr. Schumway Starting Out in His Argo Roadster.

The remainder of the road on the west side of the river was practically unimproved. In fact, for a distance of five miles an exceedingly rough road condition put the roadster to one of its most severe tests. However, Mr. Schumway states that at no time was his car in difficulty.

Crossing the river at Roscoe the car was turned south on the Beloit road, passed over earlier in the morning.

At this location the car was given its only rest. After a luncheon on the road and a rest of about an hour, the journey was resumed toward Rockford. Just outside the city the car emerged into Sinnissippi Park over a well built road but with a very steep grade. On arriving at the top of the hill the odometer registered 53.7 miles. From the park the road continues over the high north end bridge through the city and up Corey's Bluff. Corey's Bluff has a very steep grade; but the machine negotiated it successfully and was soon on its way around what is known as the sixteen-mile loop, which consists of a model hard road course. Just after crossing the river at the Nelson bridge the next section of the trip was made through the southeast end of Rockford, and the roadster, still running seemingly as strong as ever, continued on its way to Belvidere via the St. Charles road. The surrounding country just prior to Belvidere is reputed for its interesting scenery. The famous old log cabin at Five Points, the Kiswaukee River, and Cherry Valley constituted probably the most enjoyable part of the trip.

Arriving at Belvidere Mr. Schumway had a pleasant dinner at the hotel, and the trip was again resumed over the State road, the roadster arriving at its original destination at 8:30 P. M. The odometer showed a total mileage of 104.3 miles covered, with a sufficient charge left to complete another four or five miles.

The roadster is equipped with a 40-cell Hycap-Exide battery and has been in service daily. Up to the present time the batteries have never been washed and the car has been entirely free from any repairs whatever.

It will be readily understood that, so far, tours of this kind are the exception rather than the rule. It will not do to assure the prospective purchaser of an electric that, with the record of Mr. Schumway or some one else before him, he can straightway go and do likewise. That such trips are made at all, however, is sufficient evidence that it will not be long before not one, or two, but *every* electric will cover a hundred miles of country road at the will of its driver.

Boston Club Has a Frolic

The members of the Electric Motor Car Club of Boston were the guests of C. L. Edgar, president of the Boston Edison Company, at the New England Kennel Club in Braintree recently for the second annual outing of the electric vehicle dealers. It was a very happy party, with the best of good fellowship prevailing among gentlemen who are rivals in commercial life, but who like to indulge in reciprocity as a very important feature in promoting the welfare of the electric vehicle industry.

The trip was made from Boston in electric vehicles and in the afternoon the main attraction was a base ball game between the Central Station Stars and the Vehicle Victors. The latter won by a score of 17 to 8 on account of the excellent battery work of Pawlowski and Tiffany. The latter was behind the bat with Pawlowski doing the twirling and fanning 16 of the Stars. The members of the latter team actually threw away the game, however, as they had very poor direction in attempting to locate the objection point when a throw was necessary. J. S. Codman officiated as umpire.

Some of the members enjoyed a session of trap shooting, taking lessons in locating the birds from J. L. Snow, general manager of the Peerless Motor Car Company of New England, who holds the B. A. A. and state championship in this branch of sport. Mr. Snow's presence at the electric men's outing was explained later on by the announcement that his company is to act as distributers for the Rauch & Lang electrics after August 1. This announcement was gracefully made by D. C. Tiffany, who introduced this make of car to Boston motorists.

Converse D. Marsh of New York, won the quoit-throwing competition from Colonel Bailey and Herr Nicholas Rommelfauger. Along towards evening the members and their guests sat down to a real kennel club dinner, after which there was a session of speech-making. Day Baker, president of the club, had charge of the meeting and in the course of his remarks he thanked Mr. Edgar and the Edison Company for providing such an excellent entertainment.

Among the guests were W. H. Whiteside and I. H. Page, president and treasurer, respectively, of the Stevens-Duryea Company. They arrived with J. W. Bowman, distributer for Waverley electrics and Stevens-Duryea gasoline cars.

W. H. Atkins, general superintendent of the Edison Company, and E. S. Mansfield, vice-president of the Electric Motor Car Club, assisted in making everybody happy.

Addresses were made by Albert Weatherby, agent for the Detroit Electric; F. M. Kimball, president of the New England Section of the Electric Vehicle Association of America; Colonel E. W. M. Bailey of Bailey Electric fame, and R. S. Hale of the New England Kennel club.

Another Cut in Tire Prices

A Boston dispatch says there is more than a possibility that this fall will witness another cut in tire prices. It will be recalled that last April prices were slashed 10 per cent in an effort to check competition, but there has arisen in the last few months a peculiar situation.

The price of crude rubber for many months has shown a declining tendency. Crude rubber is today 20 per cent to 25 per cent cheaper than twelve or fourteen months ago, although within a few weeks the market has again turned upward.

The big makers of tires like Goodrich, Goodyear and United States Tire Company necessarily have to carry enormous stocks of crude rubber on hand to meet their production demands. A normal stock would be a month's supply and six weeks' supply is a far more comfortable quantity.

On the other hand, the very prosperity of the tire business has led to the entrance into the game of a large number of little fellows, with small capital and little or no money to lock up in stocks of crude rubber. These little producers have been obliged to buy their rubber in the open market in hand-to-mouth fashion. The steady decline in prices has of course worked strongly in their favor.

Many of the smaller companies have been making profits of 12 per cent to 16 per cent in manufacturing tires, coming in under the price umbrella held by the big producers, who have been struggling along with a 7 per cent or 8 per cent manufacturing profit and perhaps even less.

If prices are leveled again it will be to get after the little producers, who it is felt have been reaping where they have not sown. Of course, on the other hand, a sharp advance in crude rubber would cripple the small makers and if prolonged enough would put some of them out of business altogether. The next few weeks will probably tell if prices of tires are to be again reduced this year.

Trucks in Chicago Must Have Fenders

After September 21 all automobile trucks and commercial power vehicles in the city of Chicago must be equipped with fenders similar to those now in use on street cars in that city. The ordinance was passed by the city council June 23, going into effect ninety days from that date, and reads as follows:

> It shall be unlawful for any person, firm or corporation to use and operate within the city of Chicago any auto car or truck for the purpose of conveying therein bundles, parcels, baggage, or wares, merchandise or other similar articles, unless said auto car or truck is provided with a fender as in the case of street cars operated and used within said city, of such design as may be approved by the Board of Inspectors of Public Vehicles.
>
> *Section 2.*—This ordinance shall be in full force and effect in ninety days from and after its passage, approval and publication.

Cost of Maintaining a Passenger Electric

Some Data Derived from the Reports of Actual Users

BY CHARLES C. HAVILL

THE electric pleasure car has attained such popularity with the general public that the attributes of its success can be summarized with the mention of luxury and reliability. However, these facts usually suggest the item of expense, both as to the purchase price and the expenditure necessary for upkeep or maintenance. A great many prospective owners have accepted the truth of the existing luxury, reliability and comfort of the electric, and have, as a direct result, considered the purchase price favorable, yet have entertained a hesitancy and a doubt as to the magnitude of this expense of maintenance. Figures revealing the facts in this case, even if obtained, have not been published often enough to become a part of public knowledge. Most people know the cost of gas and many are familiar with the mileage per gallon which may be expected; but not so many know the costs of battery charging and renewal.

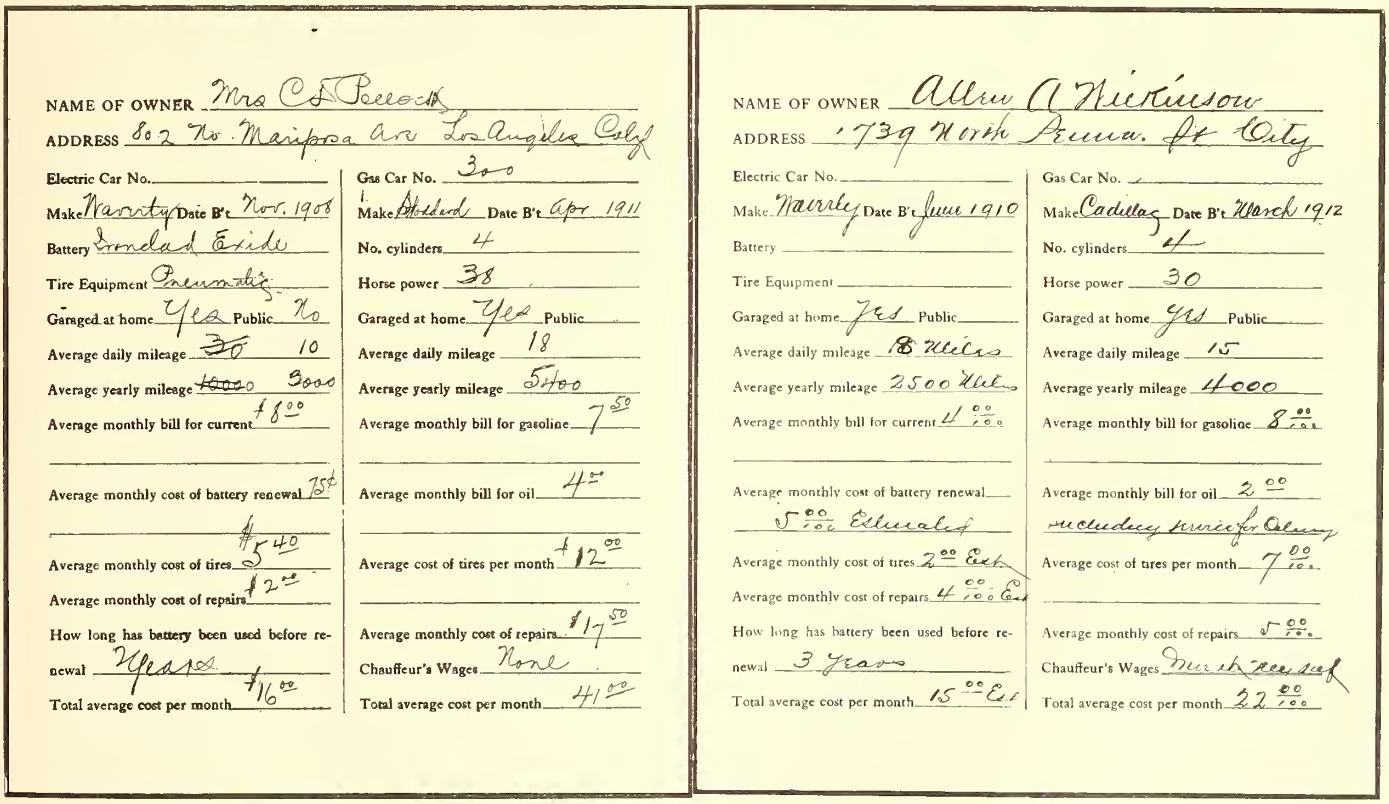
Comparative records kept for a certain reasonable period of time are one of the most persuasive methods of convincing a prospective owner that the electric can be run at a reasonable expense and at a lower expenditure than that attached to a gas car.

There has been a very general lack of information and figures as to the comparative expense of upkeep, due to the fact that this item differs with owners and conditions. Many people who use their machines a great deal find that it costs them less than some of their friends who use their machines much less. This condition does not arise from defects in the manufacture but results directly through lack of attention and the improper care of the car. Simple in mechanism as is the electric, nevertheless there exist certain regulations which must be adhered to in order to obtain reliable service and comfort at a minimum expense of maintenance.

Probably one of the greatest errors is made by owners of electrics in charging their cars too often. That is, a great many cars are put on charge when there is sufficient current still left in the batteries to give ample mileage for another day's use. This too frequent charging not only adds unnecessarily to the expense of operating, but also shortens the life of the battery, needlessly.

Realizing the importance of obtaining convincing facts as to the cost of upkeep, manufacturers have endeavored to secure figures from their purchasers in order that some average result may be determined.

The Waverly Company has sent out to owners of its cars a printed form showing the expense of maintenance of the electric as compared with the gas car. In each case we find the gas car the most expensive to maintain. Taking into consideration the actual reports returned to the Waverly Company, we can justly state that the majority of cars show an average yearly mileage of 2,000 to 2,500 miles, the average monthly bill for current estimated at $2.50 to $5.00. The battery renewal varies from two to five years. Tire equipment deserves much consideration in that it factors as one of the most important items of expense. A great number of reports show the pneumatic tire in use with an average monthly cost of repairs ranging from $2.00 to $6.00, whereas with the use of the solid tire the expense is practically nominal. However, reports from cars equipped with pneumatic tires



NAME OF OWNER Mrs C F Pollock
ADDRESS 802 No. Mariposa Ave Los Angeles Calif

Electric Car No.
Make Waverly Date B't Nov. 1908
Battery Ironclad Exide
Tire Equipment Pneumatic
Garaged at home Yes Public No
Average daily mileage ~~30~~ 10
Average yearly mileage ~~10000~~ 3000
Average monthly bill for current $8.00
Average monthly cost of battery renewal 75¢
Average monthly cost of tires $5.40
Average monthly cost of repairs $2.00
How long has battery been used before renewal Years
Total average cost per month $16.00

Gas Car No. 300
Make Stoddard Date B't Apr 1911
No. cylinders 4
Horse power 38
Garaged at home Yes Public
Average daily mileage 18
Average yearly mileage 5400
Average monthly bill for gasoline 7.50
Average monthly bill for oil 4.00
Average cost of tires per month $12.00
Average monthly cost of repairs $17.50
Chauffeur's Wages None
Total average cost per month 41.00

NAME OF OWNER Allen A Nickinson
ADDRESS 1739 North Penna. St City

Electric Car No.
Make Waverley Date B't June 1910
Battery
Tire Equipment
Garaged at home Yes Public
Average daily mileage 18 Miles
Average yearly mileage 2500 Miles
Average monthly bill for current 4 00/100
Average monthly cost of battery renewal
5 00/100 Estimated
Average monthly cost of tires 2.00 Est
Average monthly cost of repairs 4 00/100 Est
How long has battery been used before renewal 3 Years
Total average cost per month 15.00 Est

Gas Car No.
Make Cadillac Date B't March 1912
No. cylinders 4
Horse power 30
Garaged at home Yes Public
Average daily mileage 15
Average yearly mileage 4000
Average monthly bill for gasoline 8 00/100
Average monthly bill for oil 2.00
including service for Oiling
Average cost of tires per month 7 00/100
Average monthly cost of repairs 5 00/100
Chauffeur's Wages Not necessary
Total average cost per month 22 00/100

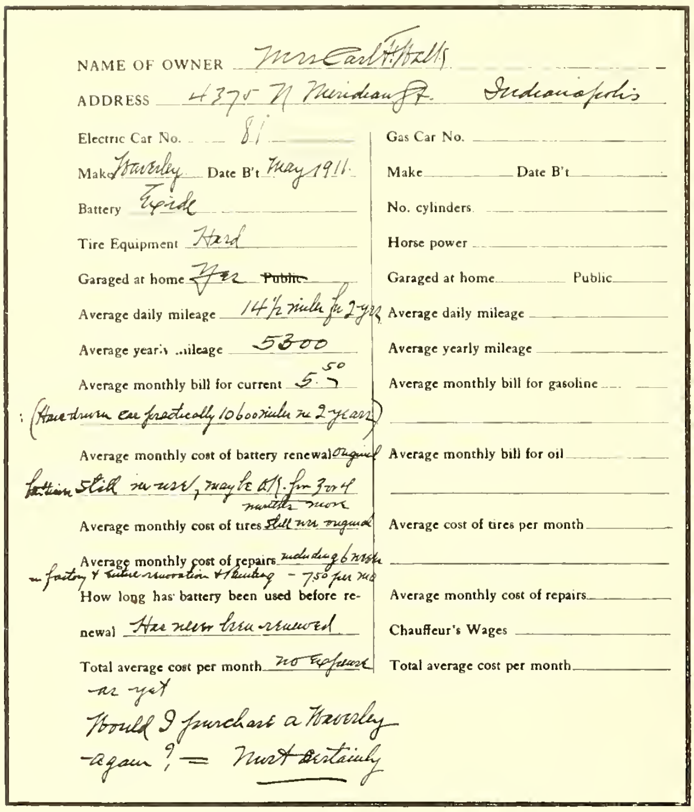
Examples of Forms Sent Out by the Waverley Company, Filled in and Returned by Car Users.

show a comparative decrease in the amount of current used and a longer life of the battery.

The greater number of reports show that the owners have installed their own garages, which is usually the most expensive factor in the upkeep of a car.

Taking an average of the items as shown on the reports of the Waverly Company we feel justified in placing the cost per month as ranging from $2.50 to $9.00, including all items with the exception of a battery renewal, averaging every 2½ years.

The following statement sent in by a Mr. More of Sioux City, Iowa, represents the total expense for electric current during the past two years:



NAME OF OWNER Mrs Carl F. Walk
ADDRESS 4375 N Meridian St. Indianapolis
Electric Car No. 81
Make Waverley Date B't May 1911.
Battery Exide
Tire Equipment Hard
Garaged at home Yes ~~Public~~
Average daily mileage 14½ miles for 2 yrs
Average yearly mileage 5300
Average monthly bill for current 5.50
(Have driven car practically 10600 miles in 2 years)
Average monthly cost of battery renewal Original battery still in use, may be O.K. for 3 or 4 months more
Average monthly cost of tires Still use original
Average monthly cost of repairs including 6 weeks in factory & entire renovation & painting — 7.50 per mo
How long has battery been used before renewal Has never been renewed
Total average cost per month no expense as yet
Would I purchase a Waverley again? = Most certainly

Gas Car No.
Make Date B't
No. cylinders
Horse power
Garaged at home Public
Average daily mileage
Average yearly mileage
Average monthly bill for gasoline
Average monthly bill for oil
Average cost of tires per month
Average monthly cost of repairs
Chauffeur's Wages
Total average cost per month

Another Waverley Maintenance Form.

1911		1912	
January	$ 5.48	January	$ 2.51
February	1.00	February	3.45
March	1.48	March	2.00
April	3.76	April	3.00
May	7.85	May	2.00
June	8.78	June	3.30
July	7.75	July	4.85
August	6.50	August	3.40
September	3.19	September	3.20
October	8.66	October	4.85
November	4.34	November	2.00
December	3.55		
Total for two years			$96.90

In submitting this statement Mr. More states, in a letter dated Dec. 3, 1912, that Mrs. More uses her Woods electric on every possible occasion and says further that there was no other expense for operating the car other than included in the above table. The original battery is still in operation.

Figures such as these submitted, although not standard, tend to give an estimate of cost of maintenance, based on specific cases, and in view of the fact that these figures show a smaller expense of maintenance than that of a gas car, the prospective owner should have no doubt as to his investment in an electric.

The Electric as a Cold Weather Car

"Along about this time of the year we motorcar people notice a sudden switch in the criterions by which prospective buyers judge a car," said William C. Little, sales manager of the Borland-Grannis Company, the other day. "Summer is gone for good and we have a long winter siege to look forward to. Naturally the man or woman who is in the market for a car goes pretty deeply into the question of its utility in the cold and stormy season of the year.

"And right here, it seems to me, is one of the sorest spots of the gasoline-car business. In the summer time the purchaser is apt to weave dreams of long cross-country trips out on smooth roads, lined with daisies and sunflowers. So he wants to know how far the car will go with one *full tank* of gasoline; how many miles it will make on high speed, and so on. But when the cold morning dew and chilly evenings come along he begins to think of the stinging cold, the snow and ice and blizzards that we have got to go through soon. In that kind of weather he finds that his gasoline car can't give him much service. The engine has to be nursed along and blanketed or else it gets out of kilter. Unless he has a coupe body he is sure to get numb fingers at the steering wheel and the sharp winds seem to go right through the side curtains. In short, he finds he has a warm weather machine exclusively and he doesn't get the service out of it that he expected when he bought it.

"Right here is one of the beauties of the Borland electric car. Its comfort and convenience are never brought home so forcibly as in zero weather, or in a good old fashioned blizzard. There is no tinkering with mechanism out in the freezing weather. Nothing to do but sit inside and push the lever. When you pull up at a curb you don't have to blanket the hood to keep the 'insides' warm. In the Borland we have taken particular pains to build a coach that is not only cold-proof but draft-proof. In some cars the brakes are operated through a long slot in the floor of the carriage. Now this opening is a fine place for the piercing winter wind to get through and blow right on the feet of the operator, besides making the interior of the car uncomfortably cold. On the Borland we use a patented device so that no matter in what position the brake is placed there is no opening. As a result the coach is absolutely weather-proof. This is only one of the little things that mean so much to Borland owners and we are finding the prospective buyers are showing a keen appreciation of this feature of our car."

The Allen Bradley Company of Milwaukee, Wis., manufacturers of electrical products and supplies had charge of the installation recently of two new battery charging boards in the Fashion Electric Garage on Cottage Grove avenue in Chicago. Compression type resistance rheostats were used. The boards were equipped respectively, with thirty and forty-five circuits.

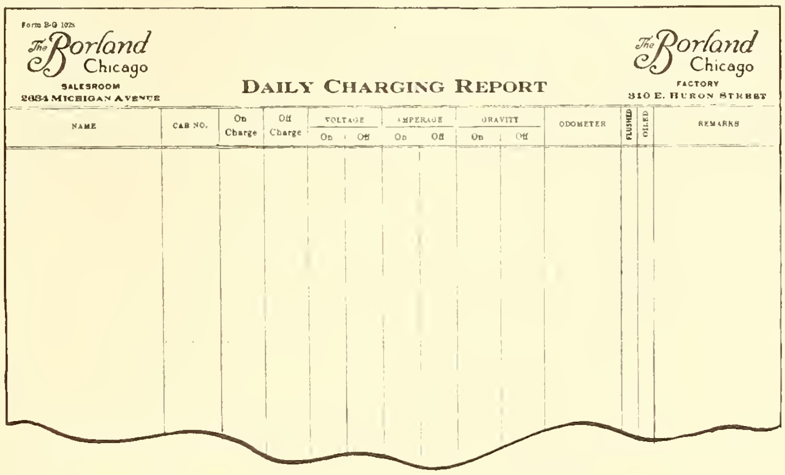
An American consul reports that the medical officer of a local municipality has left for London on leave of absence, and he has been instructed by the council to examine the different makes of electric-motor ambulances with a view to the purchase of two such vehicles for local use. One of the ambulances is intended for ordinary use and the other is for handling infectious disease cases.

Service Garage of a Car Manufacturer

The Borland-Grannis Company's Station for the Care of Customers

BY WENDELL MALLETT

RAPID progress in any industry depends upon the development of conditions which govern the product in the exercise of its actual service. In every new industry manufacturers find certain obstacles which must be overcome in order to insure a perfect service. Every established line of business has had its difficulties, not only in improving the object of manufacture, but also in controlling successfully the conditions which govern the product after it has been placed in service. Probably more so in the automobile industry than in any other, we find that each year's model shows improvement in its construction. Such developments have proven themselves to be absolute necessities to the advancement of the product. However, manufacturers have taken a step farther, and at the present time we find much attention centered in establishing methods of preserving the perfection of the car under its stress of constant operation. The car on leaving the factory is in perfect condition; but the next step of its existence is directly under the control of the owner, who in a great majority of cases is entirely unaware of the technical problems which may confront him in preserving the excellence of the original service. For this reason the Borland-Grannis Company has seen fit to erect a service station which is equipped with a force of skilled mechanics and battery experts, employed solely for the purpose of inspecting and keeping an accurate record of the condition of Borland cars. As before said, the average owner is unacquainted with the construction and the parts of his electric, and for this reason in many instances the repair shop is obliged to state, regrettingly, that had the car been taken care of a few months previous, the trouble could have been remedied at a nominal expense. That is, little troubles may sometimes prove to be disastrous because the owner has not the ability and the engineering knowledge to inspect his own car. Consequently the presence of the service station acts as a means of preventing trouble.


Form B-G 102b

The Borland Chicago
SALESROOM
2634 MICHIGAN AVENUE

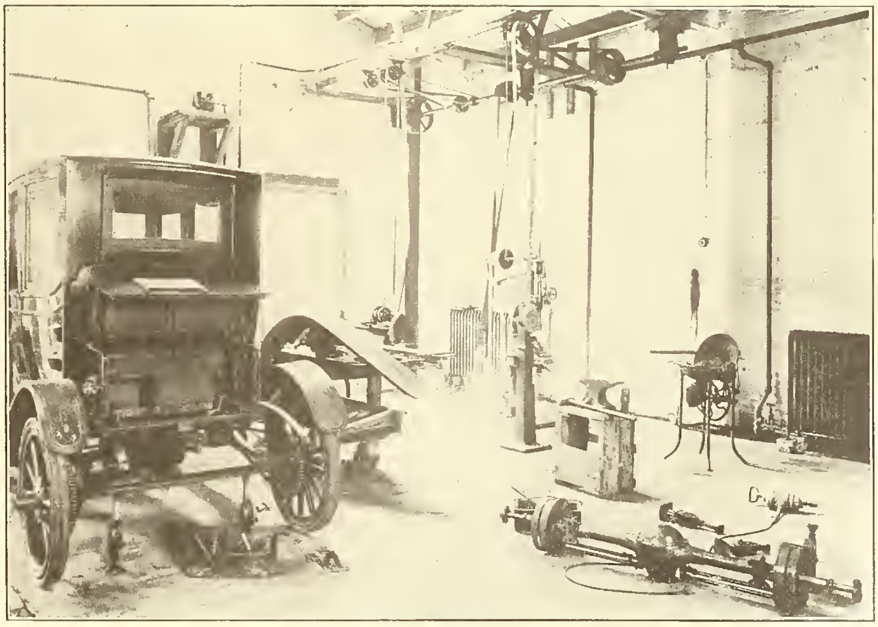
DAILY CHARGING REPORT

The Borland Chicago
FACTORY
310 E. HURON STREET

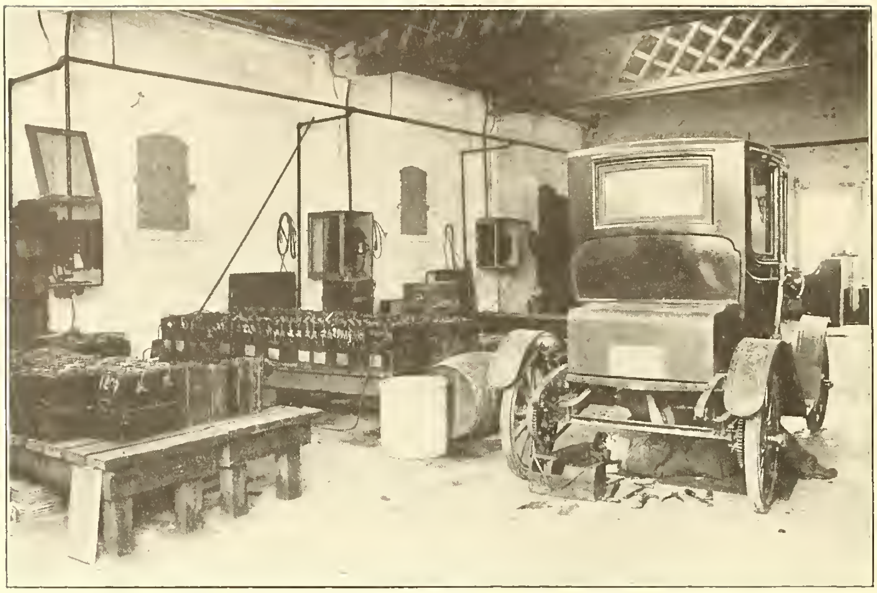
NAME	CAR NO.	On Charge	Off Charge	VOLTAGE		AMPERAGE		GRAVITY		ODOMETER	FLUSHED	OILED	REMARKS
				On	Off	On	Off	On	Off				

Daily Charging Record Form Used in the Borland Service Garage.

The Borland-Grannis Company has made it a point to educate the owners of its cars to the importance of taking advantage of the service station. At first the company found it difficult to impress the owner as to the necessity of having an inspection made on a car that was running in good condition. Further argument allowed such owners to conceive readily that keeping a constant watch on the condition of their individual cars gave them greater confidence in their machines and absolutely did away with the thought of "I wonder when I'll have my first trouble." Then again the station gives the owner an opportunity to have repair work done by men who are employed constantly on the one particular make. This specialty of repairing insures a service quicker and less expensive, due to the fact that any new parts can be quickly obtained from the factory at cost price, all renewals being of the same quality as in the original. In a case where a repair or a renewal is necessary, an estimate is obtained and the owner advised of the cost.


The Service Station's Repair Shop.

The station, installed June 1 of this year, is under the direct supervision of Richard Mansell, retail city branch manager. Mr. Mansell is not only a salesman, but has had also the engineering training which makes him adaptable to this work. Located at Calumet avenue and Thirty-ninth street, the Chicago station is centrally located, which allows owners to have inspections made without much loss of time. At the present time there are, on an average, two hundred electrics inspected a month. Records are kept of the inspections on a daily charging report. In order to handle the great number of cars submitted for inspection, the company has arranged a certain day of the month for each owner, at which time the car can be called for or brought in for its monthly inspection.


Battery Department of the Borland Service Station.

The interior is so arranged as to serve not only as a repair shop but also as a modern electric lighted garage. A large floor space in cement furnishes ample room to take out and wash the batteries. The extreme end of the garage is reserved as the machine shop, and is supplied with a complete equipment similar to that used in the factory. One wall contains the charging plug system, three lines with plugs, and one open line with batteries. The station is protected in the winter months by a steam heating system, the radiators impanelled in the wall.

Considerable expense is entailed in the maintenance of this element in the Borland-Grannis manufacture. However, the fundamental principle, long life of the car with a continuation of good service, is obtained through the efforts of the company in this method of educating its owners, free gratis.

Electric Trucks Increase Sales

The adoption of the electric truck by scores of business firms the past year, coupled with the increase of nearly thirty per cent in truck sales in Massachusetts the past four months, has led many business men who have previously paid no attention to the electric type of commercial vehicle to investigate. It is a tribute to the efficiency of the electric that it has withstood tests which have in many instances been far harder than the actual work to which the truck would be put in service. But in every instance the electric has proven its ability. As a result the express companies, the breweries, the department stores and other large concerns have given reorder after reorder for electric trucks.

One feature which has made for the success of the electric is the attitude of the manufacturers. In former days, when the batteries were in an experimental stage of development, when the necessity for specially constructed tire equipment was not recognized, electric truck salesmen were prone to make rather extravagant claims for their goods. As a result trucks were sold for duties which were beyond their capabilities. Today many an electric truck salesman spends days investigating the conditions of service to which the contemplated trucks will be put, and then tells the prospective purchaser that an electric truck would not do the work as economically and efficiently as would some other means of transportation. In other words, the sales policy of the electric truck manufacturer is based upon the surety that the conditions are suitable for the truck. This policy has resulted in satisfied customers and in greatly increased popularity for the battery driven commercial car.

The new scheme of electric truck salesmanship realizes that there is a mileage limit to the trucking problem that the electric will meet; that there are certain road conditions which increase the expense of operation. When these conditions arise, which, it may be said, is seldom, the prospective purchaser is advised not to purchase an electric. In several instances actual orders have been cancelled by the manufacturer. This system has brought about a stability and confidence in electric truck salesmen which has done much good. The merchant contemplating the purchase of commercial vehicles feels that he will get honest, sincere advice based on the conditions peculiar to his own problem.

The electric salesman can point to thousands of electric trucks in the service of hundreds of prominent firms. The large fleets of the country are practically all electrics. A local express company recently placed a single order for twenty-five trucks for use in Boston. A prominent lumber company in Greater Boston uses but two of the twenty-eight horses it formerly owned, the electric trucks doing all the work the other twenty-six horses did and much more.

The present high cost of gasoline has had its effect upon electric truck sales. The continually decreasing cost of electric current, the increasing number of charging stations, the simple operation, the low insurance rate, the longevity of the electric truck as compared with other forms of transportation, the freedom from fire and explosion and the lack of need of repair has made the electric truck a strong factor in the hauling problem of Boston, and the rapidly increasing number in the city proves the efficiency of the battery driven commercial vehicle.

Next Meeting of the E. V. A.

The regular monthly meeting of the Electric Vehicle Association of America will be held in the Edison Auditorium, 44 West Twenty-seventh street, New York City, on Tuesday, September 23, at 8 p. m. "The Value of Power Wagon Operation to the Community" is the title of the paper to be presented by F. J. Ryan of *The Commercial Vehicle*. Since this is the last meeting before the Chicago convention it is hoped that all members will make an effort to attend. The change in address of the meeting place should be noted.

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CHICAGO, SEPTEMBER, 1913

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FOR THE E. V. A.

LIKE all other commercial associations, the Electric Vehicle Association of America is dependent for its very existence on the money contributed by its members and patrons. Nothing can be accomplished in a commercial way without money—by an association or by anybody or anything else. It is absolutely impossible for a manufacturer of electric trucks or passenger cars to make any progress without the expenditure of money. This philosophy, trite to the manufacturer because he sees it demonstrated every day, is inflicted here to introduce the fact that money spent through a good association—the Electric Vehicle Association, to be specific—will go farther and accomplish more than money spent individually.

The first year's campaign of the E. V. A. came to a conclusion about August 1st, with a total fund amounting to $42,036.52. The total number of contributors was 102.

This year the campaign is not yet closed, though the middle of September is past, and the fund totals only $33,971.00, although there have been 103 contributors—one more than last year.

In order even to equal the work of last year, the association must have $8,000 more.

There are 43 new contributors to this year's fund. But 41 of last year's contributors have not yet subscribed this year. If each of these 41 would renew his subscription for even a small amount (the average necessary to make up the deficit would be less than $200) the success of the second year campaign would be assured. But some of these 41 are out of business and in other cases there are perfectly sufficient reasons—we quote the chairman of the association's publicity committee—for their non-support financially of the movement for the second year.

The electric vehicle manufacturers are supporting the movement this year to a somewhat fuller extent than during the first year. But on the other hand, two important contributions are based upon the committee securing $40,000 as a minimum, and this sum must be subscribed before the association can do anything.

Of the money contributed to the fund, over 50 per cent comes from the central stations. And of course the central stations get their money's worth, since the electrics cannot operate without them. But the central stations cannot get a dollar of revenue from this source until the vehicle manufacturers have sold their product. Not only must a man buy something to charge before he buys current to charge it, but in order to be a new customer of the central station he must be a new customer of the vehicle makers. He becomes a buyer of both car and current contemporaneously, and he cannot buy one without the other.

So electric vehicle publicity, whoever fathers it, benefits the manufacturer and the central station equally.

It is a characteristic of good printers' ink publicity that its effect increases more rapidly than its quantity. The effect of a full page of advertising is much more than eight times as great as the effect of a one-eighth page advertisement, and it frequently costs less proportionately. That is one of the benefits of association. Just as the large buyer gains an advantage over the small buyer, an association accomplishes for its members what they could never accomplish for themselves.

It must be obvious to all that the E. V. A. fund not only is disbursed for the benefit of its contributors, but cannot possibly be used for any other purpose than that benefit. The officers in charge of that disbursement have proven the efficiency of their handling beyond a peradventure.

Let it be said here that the opportunity to contribute to any such trade organization as the E. V. A. is a thing to seek, not to avoid. In no other known way can an industry advance so rapidly, carrying its members up with it, as through the co-operative expenditure of small individual appropriations united into a big aggregate.

The E. V. A. must have $8,000—a sum which, divided among those who should be interested, is pitifully small. It would be a shame for October to find the fund still short.

THE BIG EVENT IN OCTOBER.

IN another month all the manufacturers of electric vehicles and their sales managers and other officers, all the central station men whose companies sell charging current, all the tire and accessory men, and all the electric garage men of the country will be making preparations to go to Chicago for the big E. V. A. convention. We say *all* because we hope there will be few, if any, left at home when October 27th arrives. Not all of you, of course, have decided just yet that you will go. You have your own business to look after, and next year's campaign to plan, and a hundred other things to keep you on the jump. You are not sure that you can spare the time.

If some one in whom you had implicit faith said to you, "Spend two days with me and I will tell you what business will develop in the next year, what your competitors are doing to get business, what new fields of prospects have been discovered, what influences are working for the good of your industry," you would accept the invitation without an instant's hesitation. A national trade convention does just those things; and then it goes on and gives you the very *ne plus ultra* of good fellowship and entertainment.

So we say *every* man interested in electric vehicles should attend the convention. It is not a question whether you can afford the time to go; the condition is that you cannot afford the inevitable loss you will suffer if you stay away. The yearly get-together function is as necessary to the welfare and progress of any business as the most elemental social intercourse is necessary to the happiness of humankind.

Two days out of the year's three hundred means only two-thirds of one per cent of your business time—equivalent to three minutes a day. That is a ridiculously insignificant price to pay for a world of valuable information in a setting of unalloyed pleasure.

BOOSTING THE ELECTRIC.

THE remarkable success of the automobile during the last ten years has startled anyone who has seriously considered it. Aside from the infinite care and unlimited skill that has been devoted to the perfection of the car and the large amount of capital that has been invested in the industry, the factor of greatest advantage has been the boosting done by the public at large. Every one has talked automobiles, and the country might almost be said to have gone "automobile crazy."

The development of a machine for pleasure was the greatest factor at first, and the car was used the most by those riding for pleasure. The next development was one of service, the ability to get from one place to another quickly and comfortably. This feature of service is now the greatest factor in the automobile industry and one upon which its future largely depends.

The development of this industry has in some ways followed that of the bicycle. At first the bicycle was a pleasure machine and at the present time it is almost solely used by messenger boys or workmen.

In this great development of an industry that has popularized itself the world over, the greatest development of all is the electric.

The electric is not a touring car, neither is it a racer. The day of the electric passenger car has come because it is primarily a car of service. Its service in its present field comes through its simplicity and reliability. It is simple to run, simple to house, and simple to take care of. Ladies become its drivers without the labor and exposure to dirt usually incident to the task. They can start, steer or stop the car with a motion of the handle of the controller, and the rate of speed is entirely within their control. The professional man with his many calls and often extended visits requires a car that is ready at a moment's notice, and one that requires the least mental and physical effort to start, stop, or thread through the crowded streets. The greatest effort on the part of the operator of an electric is to intelligently let alone the power plant of his car.

When you are outside the theater in the evening, notice the increasing popularity of the electric coupe for the theater party. Its service and its luxury have made their impression on the public.

No better proposition for co-operative boosting ever existed! The manufacturer wants to sell his electrics and with him go the co-operative efforts and good will of the manufacturer of the motor equipment, battery and tires. The central station wants to sell current generated during the low spots of the power curve, thus increasing the load factor, and is coming to realize that every electric means a guaranteed power consumer. Together these are all interested in the satisfaction of the ultimate user of the car.

Now is the time to boost; the opportunity is at hand. Let the central station man get a habit of saying a friendly word for the electric, and thereby act as one of the most important elements in building up the electric vehicle industry in its legitimate field.

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There are no bonds, mortgages or other securities outstanding against ELECTRIC VEHICLES.

ED J. MOCK, *Business Manager.*

Sworn to and subscribed before me this seventeenth day of September, 1913.
(Seal) Leona J. Ekstrom.
My commission expires Aug. 17, 1914.

The Economic Delivery of Meats

A Paper Read Before a Recent Convention of the Master Butchers' Association

BY DAY BAKER

President New England Section E. V. A. Day Baker.

WITH the constantly advancing price of good horses, and the hay and grain required to feed them, to say nothing of the advances of wages required by the stable help, the more insistent calls of customers for prompt service, the greater distance to which it is necessary to carry your product, together with the strict sanitary rules which are now being enforced in most cities, it seems imperative that you adopt a more economic, reliable, speedy and sanitary method of deliveries.

The cost of horses has steadily risen during the past ten years, and their food by leaps and bounds. If by any means we could utilize one-half the acreage now devoted to the raising of hay and oats for horses to the production of livestock for food purposes, think of the additional business it would mean to you, and the great good it would do the meat eating world at large.

The users of provisions, by which I mean the retail markets and the hotels, are calling for prompter deliveries, and more frequent service, which means more wagons and faster means of covering the ground.

And, furthermore, the radius which every wholesaler and retailer is seeking to cover is being constantly increased, so the practical mileage obtainable by the horse, and the speed with which this mileage is covered, is far from satisfactory, in addition to being very costly. The packers and wholesalers, if they are to keep their present fields and extend their deliveries, as it seems necessary to do, must for economy's sake adopt some form of transportation more efficient than our good friend the horse.

The larger houses have for years been experimenting with various forms of motor trucks. Back in 1907 Swarzschild & Sulzberegr at the Jamestown Exposition at Norfolk, Va., put in service the first motor truck used for carrying meats, and strange as it may seem to many of you who have experimented with motor trucks, that original machine, an electric, is still in service in New York today. But the word "electric" explains its long life, for, as you may know, there is no fast vibratory engine, change of gears, or running at excessive speeds with an electric truck.

Viewing horses as we of the motor vehicle world would do, and as all of you interested in transportation soon will, it cannot be long before the consideration of motor vehicles will be actually forced upon you from an economic standpoint.

Not only are horses themselves expensive, the food they eat costly, but the space that they and the wagons, feed, harness and manure occupy costs money. This space, if added to your productive plant, would be bringing you income in place of expense.

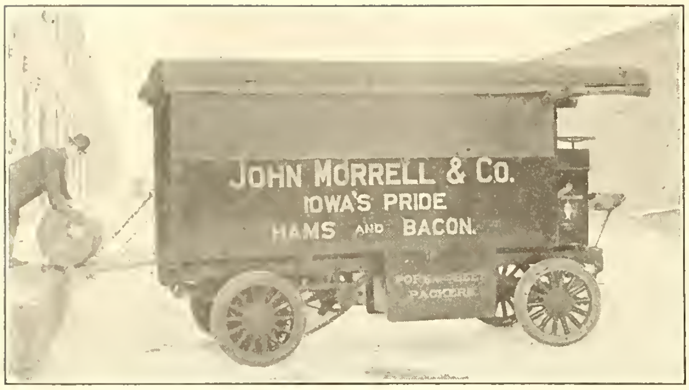
Just compare the difference in space required for vehicles capable of carrying say five tons of meat over routes approximately say 30 miles:

The horse equipment would require.

Space for two trucks	240 square feet
Stalls for four to six horses	160 square feet
Harness room	60 square feet
Hay, grain and bedding, storage	120 square feet
Manure storage	30 square feet
Total	610 square feet

As against this, an electric truck which would easily

A Schwarzschild & Sulzberger Fleet of General Vehicle Electric Trucks.



Loading a G. V. Truck Belonging to John Morrell & Co.

G. V. Trucks Belonging to Kingan's of Indianapolis.

do the same amount of haulage would require only 160 square feet, which at one dollar per square foot per year, the New York price, would show a net saving on space alone of $450 per year.

There is another point worthy of your most serious consideration—the sanitary aspect. Think of the millions of flies bred in the barns that, after living on the filth of the stables, without wiping their feet alight on your products and thus spread disease and death.

THE REMEDY FOR HIGH DELIVERY COSTS

As intimated before, the remedy for excessive cost of transportation, and relief from unsanitary troubles, is the motor truck. Motor trucks are constructed with two forms of driving power: gasoline engines and electric motors. The gasoline driven machine is adapted and works in its most economic field when used over long cross-country runs where speed and distance are the controlling elements.

As high speed and long distance all add to the cost of deliveries, and as you all seek to sell and deliver goods in the most economic field, I am going to talk of the especial motor vehicle that will earn you the most money, by delivering the greatest amount of goods in the economical radius, with the least expenditure for maintenance, fuel and labor—the electric truck.

Referring to the five-ton unit, pardon me for calling your attention to a few figures, based on a 30-mile day:

HORSES.	
Space, sq. ft.	610
Space value	$ 2.00
Feed	5.00
Drivers	6.00
	$13.00

ELECTRIC.	
Space, sq. ft.	160
Space value	$0.50
Electricity	1.00
Driver	3.00
	$4.50

These are only a few figures. It is safe to say that the two five-ton horse trucks, with all expense items considered, cannot be operated for less than $12 to $18 per day, with all expenses increasing; while the electric truck can be operated for $8 to $11 per day, and the price of big items like electricity, batteries and tires decreasing. Electricity was formerly sold for 10 cents per kilowatt hour. It can now be had for 1½ to 4 cents in the larger cities. Tires have been greatly reduced in price and can now be had guaranteed for 10,000 miles or 18 months, while battery costs have fallen 20 per cent in the past few years.

But, you ask, do many packers and provision houses use electric trucks, and with what success? I shall assume that you all come from Missouri and want to be shown; therefore I will read you the names of a few of the packers, butchers and provisioners who have already from one to twenty-four electric trucks:

A. Silz., Inc., New York City; Sulzberger & Sons Co., New York City; John C. Roth Packing Co., Cincinnati, Ohio; T. M. Sinclair & Co., Ltd., Cedar Rapids, Iowa; Sulzberger & Sons Co., Chicago, Ill.; Swift & Co., New York City; United Dressed Beef Co., New York City; Charles Weisbecker, New York City; George Zehler Provision Co., Cincinnati, Ohio; Adolph Gobel, Brooklyn, N. Y.; Armour & Co., Chicago, Ill.; Armour & Co., New York City; Armour & Co., Philadelphia, Pa.; N. Auth Provision Co., Washington, D. C.; J. Hoffman Packing Co., Cincinnati, O.; Kingan & Co., Richmond, Va.; Kingan & Co., Washington, D. C.; Kingan Provision Co., Cincinnati, O.; Krey Packing Co., St. Louis, Mo.; D. B. Martin Co., Philadelphia, Pa.; John Morrell & Co., Memphis, Tenn.; John Morrell & Co., Ottumwa, Iowa; New York Butchers' Dressed Meat Co., New York City; George A. Hart, Essex, Mass.; Philip Ohl, New York City; Chas. Roesch & Sons, Philadelphia, Pa.; Otto Stahl, New York City; Wm. Volker Co., Kansas City, Mo.; Richard Webber, New York City.

It may interest you to hear a report which we have just received from the 3½-ton truck in the service of Sulzberger & Sons, Chicago.

A Sulzberger & Sons Company G. V. Truck.

This truck went into commission on November 30, 1910, and had covered 9,421 miles to November 30, 1911. During this period the truck has been in service every working day making deliveries of meat to downtown points in Chicago and to such suburban points as Oak Park, Kensington and Dunning. The average load carried has approximately the rated carrying capacity of the truck.

During the very hot weather this truck was performing the work of three teams, covering anywhere from 45 to 55 miles. The driver states that he had no difficulty at all in making 45 miles and picked out the following figures—49, 50.1, 52.4, 55 and 59 respectively—as proof. The only expense which they were put to during this interval was the renewal of tires after approximately 7,000 miles of service and the renewing of the Morse chain.

You will note that many of the leading packers are already satisfied that the electric truck has a very important part in the economical transportation of meats and that the retailers are rapidly following their lead. The results justify this. The Krey Packing Company has operated electrics since 1906 and one of its trucks was built in 1904. All the six electrics used by John C. Roth were built before 1907; all but one, in fact, in 1905. You see, men like these don't have to guess about a high grade truck lasting long enough to allow them to get their money out of it—they know. You can be just as sure that a high grade electric will bring you in dividends the horse could not do in a lifetime.

Otto Stahl's G. V. Meat Wagon.

MOTOR DELIVERY THE WAY OF THE FUTURE

The richest rewards of enterprise go to the man who is just a little ahead of his time. The prophet two hundred years ahead of his time was burned at the stake, but the Wright brothers, who were only five years ahead of their time, reaped honor and profit. It pays to do the thing which the people at large vaguely feel but do not clearly see.

In the near future our motor driven age will look back upon the horse as we now regard the obsolete ox; while a cleaner and more humane period than ours will wonder at the contagion and death we permitted the horse and his ally—the fly—to distribute.

The present cannot continue indefinitely to be under the domination of the past. The streets filled with slow horse-drawn vehicles must become the smooth highways of the silent and swift rubber-tired motor wagons and trucks.

Genius has entered the motor against the quadruped, and all who have witnessed the triumphs of the inventive mind over the clumsier resources of animal strength will realize that the horse must make way for the motor; for science and engineering skill are greater than brute force, and the electric truck is *here.*

Agency for Argo Electric

It was recently decided by the Bolton Auto Company of Saginaw, Mich., it could very advantageously add some high grade electric cars to its already complete line, and in view of this decision carefully considered the relative merits of various makes. The company finally chose the Argo electric, made by the Argo Electric Vehicle Company, of Saginaw.

There is nothing experimental about the Argo electric, this stage having been passed several years ago. It has stood every test that its makers could put it to, and has received the stamp of approval in the most critical markets of the country. Heretofore practically all the product has been sold in larger cities, Chicago and St. Louis being especially strong Argo territories. Little regard has been given to the sale of the cars locally. The Bolton Auto Company, however, regards the local field as most promising and anticipates that the people of Saginaw will be eager to avail themselves of the social distinction as well as the economy and convenience that this splendid vehicle affords.

Orders have been placed by the Bolton Auto Company for cars for demonstrating and show purposes and a representation of the new models which are revolutionizing electric motor car construction is now on the company's floors.

Electric Auto for Commerce

The solution of what appears to be one of the largest problems to be overcome by the men who are working out the marvelous merchandising systems of American cities seems to lie in the development of the electric commercial vehicle.

Although electric commercial vehicles have been used for almost two decades, it was not until a half dozen years or so ago that they began to take an important place in our present day scheme of haulage and delivery. Today the electric truck is making the most extraordinary advances in its field—city and suburban use.

Last year the number of electric commercial cars used in some of our metropolitan cities increased considerably over fifty per cent. And a most significant fact is that a large percentage of the machines were sold on reorders. The development of the retail trade in the larger American cities during the past decade has been a commercial wonder to the rest of the world. And it had no experience to go on—no precedent to follow. Improved merchandising methods brought a sudden and enormous increase of sales in all sorts of lines.

Department stores have had a big place in changing conditions, but every sort of retail and mercantile concern has been affected. The concentration of industries has been another factor in increasing the use of electric trucks.

Food, milk and produce supplies have been centered in the cities and all this has tended to multiply the necessity of adequate and efficient transportation methods.

Development of the Lead Vehicle Battery

How the Various Types of Cell are Made, and Their Characteristics

BY ADOLPH J. LARSON

TO electric vehicle users or prospective users, there is no subject which should be given more careful consideration than that of the storage battery. The battery furnishes the motive power for the electric vehicle. The reliability of an electric, its cost for maintenance and operation, is to a certain degree dependent upon the battery. A brief resumé of the history of the development of vehicle batteries is, therefore, of special interest.

The development of any art is largely a matter of time and experience, but in the case of the storage battery this is particularly true.

As is generally known, the first type of storage battery plate was that of Planté, designed in 1860 in which the active material was formed from the metal of the body of the plate itself by a long series of charges and reversals. The process was so tedious and expensive, and the early forms of plate so crude, that the battery had only a very limited application; and when Faure in 1880 brought out his improvement, consisting of the mechanical application of lead oxides in the form of paste to the lead blanks, it was hailed as a wonderful advance. Companies were formed and batteries turned out in large quantities, these pioneers not realizing the perplexing problems of manufacture and operation which were soon to arise. This premature exploitation of batteries utterly unsuited to the conditions under which they were used resulted in a prejudice against all "storage batteries" which took years of patient work, development and demonstration to undo.

The lamentable failure of the early forms of pasted or Faure types resulted in a return to the Planté form, and many radical improvements in construction and manufacture soon brought this type into favor for the positive plate, while for the negative an improved form of the pasted type was found to be best.

It should be understood that all that has been said so far applies to the period before the introduction of the electric automobile. By the time experiments upon electrically propelled vehicles began to show promise, about 1895, the storage battery was firmly established as an important and necessary factor in the stationary field. Therefore the natural thing to do was to apply to vehicles the types which had proved the best for other uses. It was soon found, however, that if the vehicles were to have a practical radius of action, it was necessary to develop a lighter battery, and attention was turned again to the pasted type of battery plate.

Fig. 2. Positive Plate.

As often happens in such a case, the pendulum swung too far the other way, and the first pasted plates made for the purpose were altogether too light and frail to withstand the vibration and heavy work to which, in vehicle work, they were subjected. Their capacity for weight was very high, and one of the earliest bateries put out, in 1899, drove an electric automobile over a hundred miles on one charge.

At the present time, with all the increased knowledge and the improvements in construction of both vehicles and batteries, it would be a simple matter to make a battery which could give a much higher mileage. But experience has proved that too high a capacity is obtained only at the sacrifice of life. Moreover, high mileage is necessary only in exceptional cases, and this is something many inventors do not realize, their sole aim being maximum capacity.

The Electric Storage Battery Company developed as a practical compromise between moderate capacity and long life, the present "Exide" plate. The Exide grid is a modification of an earlier form, and its principal feature consists in having the active material held in the form of a pencil or ribbon between the horizontal ribs, which are staggered so as to firmly lock the material in place. The vertical ribs extend through from one face to the other, making the plate rigid, a property which is further secured by making the grid of a stiff lead alloy instead of pure lead. The construction of the grid, which is the same for the positive and negative except in total thickness and size of ribs, can be more clearly understood from Fig. 1, which represents a section.

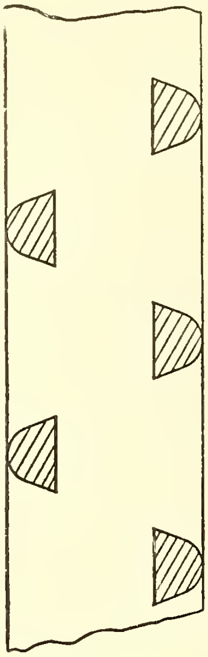


Fig. 1. Plate Section.

These brids are "pasted" with lead oxides made into a paste of special composition which sets hard in drying, like cement. The plates then go through an electro-chemical process, which converts the material of the positives into brown peroxide of lead, and that of the negatives into gray, spongy lead. Fig. 2 shows the finished positive plate and Fig. 3 the negative.

In assembling the plates, it was soon found that methods of separation which were satisfactory for other uses would not do for vehicle cells. In order to economize space, it was necessary to have the plates so close together that any perforated separator would permit the material to bridge across from one plate to another, thus causing short circuits. This presented a new problem, and, after much experimenting, in 1901 the wood separator was developed. So important was this improvement that it is a question whether the cell could have become commercially successful without it. But certain substances contained in the wood proved to be insidious poison to the cells, and only after chemical treatment to remove these was it found possible to use it without danger. A process was developed

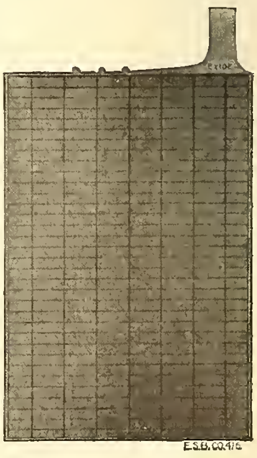


Fig. 3. Negative Plate.

which removes all deleterious substances without affecting the mechanical strength of the wood. The wood separators are grooved on the side which goes against the positive plate, to allow for circulation of the electrolyte and the escape of the gas generated when charging. To prevent the highly oxidized positive plate from charring the wood, and also to check the washing away of the positive material, due to the vibration and the gassing on charge, a thin sheet of perforated hard rubber is placed between the positive plate and the wood separator.

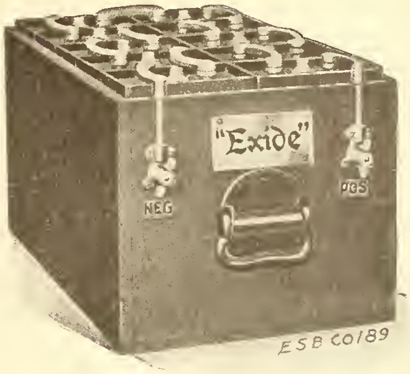


Fig. 4. Cells in Tray.

Both the positive and negative plates, as shown in Figs. 2 and 3, are provided with an extension or lug, and they are so assembled that all the positive lugs come at one side of the jar, and all the negatives at the other, thus enabling each set to be "burned" together with a connecting strap, giving one negative and one positive pole. The burning is done by a hydrogen flame, which melts the metal of both lugs and strap into an integral union. The straps are made of a hard lead alloy, and are provided with rectangular openings arranged to register with the plate lugs when the plates are assembled and properly spaced.

Of the several types of straps which have been used, the one which has given the best satisfaction in practice is the "pillar" strap. Formerly this type was used only for the smaller sized cells, but it is now made also in a heavier and more rugged style and applied to the large sizes as well. In assembling, the connectors are slipped over the pillars of two adjoining cells and burned in place. An apron extending from the lower side of the strap is for the purpose of keeping the separators in place.

The jars are of hard rubber, and are provided with ribs in the bottom to support the plates. The cover is sealed in place with a special acid proof compound, so as to prevent splashing or spilling of the electrolyte, and a vent is provided for the escape of gas generated during charging. The vent plug is removable, leaving an opening for inspection, adding water to replace evaporation and using the specific gravity of the electrolyte.

The cell units, burned together in number and arrangement to suit the vehicles they are designed for, are assembled in trays (Fig. 4) of hard wood, painted with acid resisting paint, and provided with suitable handles and terminals. Connections from cells to tray terminals are made by means of rubber covered cable, one end of which is cast into an alloy lug. This lug is burned to the terminal pillar strap connector and the free end of the cable sweated into the bronze tray terminal. There are two styles of terminal connectors, one for a perpendicular and one for a horizontal position. The bottoms of the trays are provided with slits or holes for drainage in case of leaking or splashing of the electrolyte.

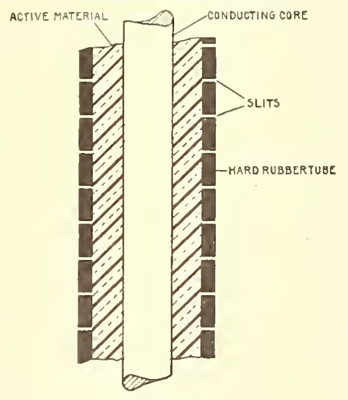


Fig. 5.

A consideration of some of the factors entering into battery manufacture will make it clear how difficult it is for a company to turn out a uniform and satisfactory product. In the first place, purity and uniformity of materials are absolutely essential. Every run of lead or alloy, every keg of lead oxide and every lot of electrolyte used is put through rigorous chemical and physical tests by experts in thoroughly equipped laboratories.

The casting of the grids, with their fine ribs, is an operation requiring much skill. Not only must the composition of the metal be just right, but the temperature must be carefully adjusted, and even with all conditions right there are little "kinks" which only men of long experience can handle so as to get perfect castings.

The composition of the "paste" applied to the grids is the result of years of experimenting. All constituents are carefully analyzed, and the mixing is carried out and supervised by men who have had years of experience. Equally important is the process of "pasting," and here also the necessity of having experienced workmen and supervision is paramount.

The pasted plates, after several treatments, go to the "forming" room, where they are put through the electrochemical process referred to above. This perfected process, with all its details, is also the result of much experimenting, and requires skillful manipulation.

After "forming," the plates go through several further operations of washing, drying and other treatments, and are then ready to be tested. A large number of samples of each day's run go to a laboratory maintained for the purpose. Here they go through a practical test, being mounted into regular cells. If the samples pass the test, every individual plate is inspected before being delivered.

Some owners of electric vehicles require a greater mileage per charge of battery than is normally obtainable from the exide battery. To meet conditions the Electric Storage Battery Company put on the market in 1907 its "Hycap-Exide" battery. The design of this type and its essential details are the same as the Exide battery, but the plates are thinner, and a larger number can be used in the same space and for about the same weight as the Exide, thus giving a greater capacity for a given weight and space, although the capacity per plate is less.

In a service calling for full mileage from a Hycap-Exide battery on each charge, the total mileage obtained during its life is about the same as that obtainable from the Exide battery. The Hycap-Exide battery is used for service in which the mileage required per charge is in excess of that which can be obtained from the Exide battery, and the life in number of charges shorter.

To meet cases requiring still greater capacity than is obtainable from the Hycap-Exide battery the "Thin-Exide" battery is furnished. For example, some vehicles must make a certain number of trips or miles per day, greater than they could make with the Exide or Hycap-Exide and require the additional capacity which the Thin-Exide battery will give them.

In general, it may be said that the Hycap-Exide and Thin-Exide batteries are to be recommended in cases where the capacity of the standard

Exide is insufficient for the service, and where the extra mileage per charge obtainable from these thinner plate types can be utilized on each discharge.

After four years of experiment and laboratory work, a practical commercial cell has been developed in the "Ironclad-Exide" battery.

Heretofore, the commercially successful electric vehicle battery plates have been plain, flat slabs, consisting of grids pasted flush with active material. Many kinds of protective coverings for preventing the washing out of the positive active material have been tried. Plates built up of parallel cylindrical pencils have been tried, but heretofore with indifferent success. But the Ironclad-Exide positive plate combines these two principles in such a way as to give high capacity per unit of weight and at the same time long life.

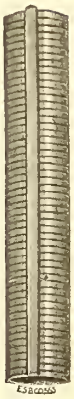


Fig. 6.

The positive has a grid composed of a number of parallel, vertical metal rods united integrally to horizontal top and bottom frames, the former being provided with the usual conducting lug. The top and bottom frames are each encased in a hard rubber sheath, which is vulcanized in position directly to the rubber tubes which form the main body of the plate, as described below. Each vertical rod forms a core, which is surrounded by a cylindrical pencil of peroxide of lead, the active material. This, in turn, is enclosed by a hard rubber tube having a large number of horizontal slits. These slits serve to provide access for the electrolyte or solution to the active material, and yet are so fine as to practically eliminate the washing out of the material. Fig. 5, a vertical section of a single pencil, makes this construction clear.

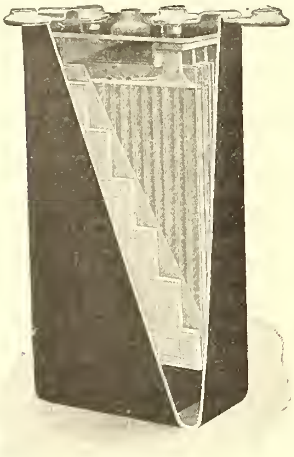


Fig. 9.

Each tube is provided with two parallel, vertical ribs projecting on opposite sides at right angles to the face of the plate. These ribs not only serve to stiffen the tubes, but also act as insulating spacers, taking the place of the ribs on the wood separators used in the Exide and Hycap-Exide batteries and allowing the use of plain wood veneers. Fig. 6 is a side view of one tube, showing the reinforcing rib. The rubber tubes have a certain amount of elasticity, allowing them to compensate for changes in volume of the active material, due to expansion and contraction during charge and discharge. Fig. 7 shows a complete positive plate. It will be seen that, since the body of the plate consists of rubber tubes and the top and bottom frames are encased in rubber sheaths, the exposed portion of the plate is nothing but rubber, so that the insulation is perfect and short circuits are eliminated.

The cylindrical form of tube is peculiarly well adapted to perform its function, since no amount of expansion or contraction will tend to alter its shape, and the internal strains are thus kept uniform. Another advantage is that most of the necessary electrolyte is carried within the confines of the plate itself.

The negative plate used with the Ironclad-Exide positive is of standard Exide type, although of increased thickness. In fixing upon the proper thickness for the negative, the aim has been to provide a plate having approximately the same life as the positive, thus avoiding partial renewals.

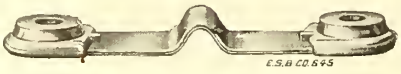


Fig. 8.

The only separator necessary with the positive plate is the thin wood veneer referred to above, the special form of the positive plates rendering superfluous the flat perforated rubber sheet used in the Exide battery.

The largely increased life of the Ironclad-Exide battery emphasized the desirability of finding a separator of greater durability than those heretofore used. As the result of investigations and experiments, the Electric Storage Battery Company developed a separator made of a kind of wood never previously used for the purpose, possessing great toughness and the property of resisting the action of the electrolyte to a remarkable degree. The separators are made with the grain horizontal, so as not to register in the same direction with the vertical ribs on the positive plates, which would tend to split the wood.

The positive and negative plates are grouped in the customary manner, the lugs being integrally burned into straps.

The connector for joining cells of the Ironclad-Exide is of a new type (Fig. 8). Thin strips of copper, lead plated to prevent corrosion, are laid face to face and their ends cast into alloy terminals. A special welding process insures a good and permanent contact between the flexible strips and the cast head or terminal, insuring good conductivity under all conditions of vibration, temperature changes, etc. The alloy terminals form rings, which fit over the pillar of the strap and are burned in place in the same manner as the Exide connector. The advantages of this built up connector are twofold, the use of copper instead of lead or alloy giving higher conductivity and the laminated structure giving a flexible instead of a rigid connection.

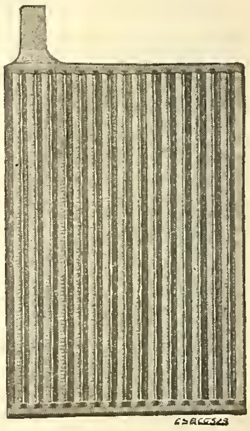


Fig. 7.

Fig. 9 shows a complete cell with the jar cut away to make clear the interior arrangement.

The advantages claimed over previous forms of lead batteries are: High capacity (except where thin plates have been used); increased life; the fact that cleaning is seldom, if ever, required; and reduced operating expense.

The cells have an initial rating of four and one-half hours at the four hour discharge rate of a corresponding Exide cell; that is, an original increased capacity of twelve and one-half per cent. As the battery is worked, the capacity will increase.

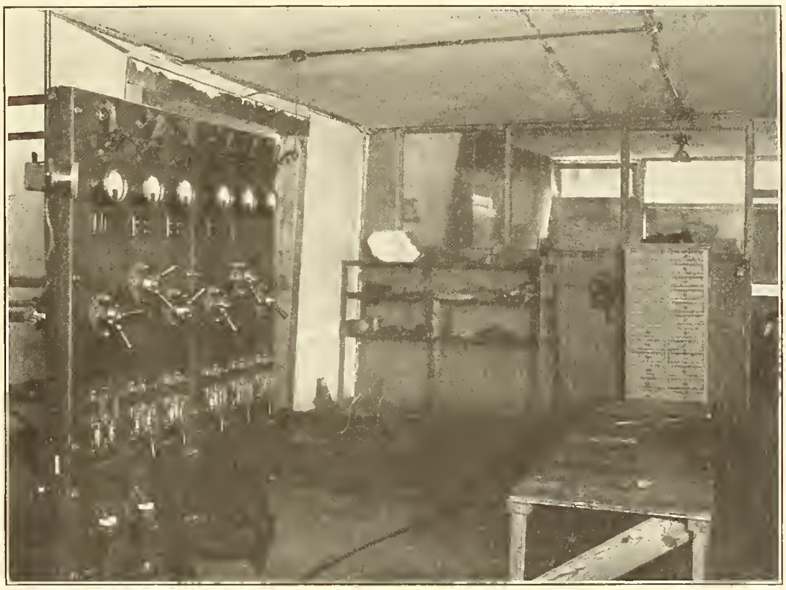
It is when the life is considered, however, that the greatest gain is found. An advantageous feature in this connection is that, owing to its stronger life, the period of maximum capacity is correspondingly increased. This means that a car will maintain maximum mileage over a considerably longer period of time. With some types of lead batteries, there is a period with each set of positive plates before renewal when the mileage is less than the maximum.

Upkeep of Electric Vehicles by Contract

A New System of Providing for Maintenance and Repairs

BY P. C. WEST

OUT of an intimate association of some fifteen years with batteries and a like identity with all the mechanical parts of the electric storage battery propelled vehicle, William Knobloch, an inventor and contracting electrical engineer whose prominence in electrical circles dates back to the time when he had the contract to install the lighting system in the New York subway, has developed a statistic-tested method of cutting down the battery and all mechanical upkeep costs of the electric. This system has proved, by its acceptance in Chicago, to be a long-sought boon for the owner of either pleasure or commercial car, while to the manufacturing industry the method apparently provides the means to a powerful stimulation.



Switchboard Panels in Knobloch's Chicago Station.

Making possible a service which cuts down all costs to a small monthly fee and which parallels a general insurance policy, the company, through its service, enables the owner to know:

Exactly what all his battery upkeep is to cost, and that the known-in-advance expense is surprisingly less than the present costs.

Exactly what his battery renewal is going to cost—the cost being nothing under the service contract.

Exactly what all his mechanical repair expense is to be.

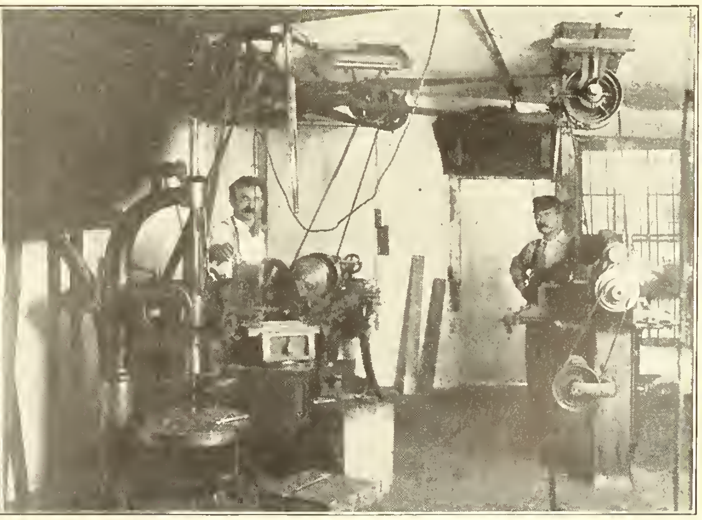
That his car will be in operation all the time, and that no repair shop delays, with their exasperation to the pleasure car owner and their heavy extra expense to the commercial car user, will have to be further countenanced.

That his battery and mechanical parts are in the hands of experts for upkeep and repair, whose purpose is to keep the car going and in good order, as the more continuously the company keeps the car in service the more profitable its business is, while, as any analysis reveals, the more the repairmen have it now the more profitable the repair business is because of the fee they collect each time.

For the electric car dealer, many of whom the Knobloch concern is entering into co-operative arrangements with, the service operates to do completely away with the one big obstacle and bugaboo the dealer has to contend with in the prospective purchaser's mind, which is that always-big question, "How much is it going to cost me to run this machine?" And the dealer has been able to give him only information which at best necessarily savored largely of guesswork. With the Knobloch service he is enabled to get right down to figures which are to a penny, and to facts which will greatly facilitate the sale.

As a whole the service seems to be a direct means

Testing a Truck Battery in the Knobloch Maintenance Station, Chicago.



View in the Knobloch Repair Department.

to a great stimulation of the electric vehicle manufacturing field. Dealers especially, and not a few manufacturers, have seen this impetus-giving advantage to the industry as it relates to Chicago, its greatest field, and have been as active in opening up negotiations with the company as private owners have been to avail themselves of the cost-reducing and accuracy-giving plan. Two of the larger manufacturers are now entering into agreements of contract by which their Chicago distributors will be enabled to deliver with each car a maintenance contract for thirty-six months, this to be a part of each machine the purchaser takes away from the salesroom floor. This advantage to a manufacturer can apply now only to the Chicago field, though the Knobloch company is soon to establish branches in all the principal cities.

The big feature of the service is that the concern contracts to maintain all battery upkeep and renewals, plus all the mechanical repairs, at a small monthly fee which for three years of service amounts, in total, to a sum equal only to the cost of one battery renewal now, and a contract to this effect, which the owner is not called upon to sign himself, is delivered to each user, just as an insurance policy is issued.

The cost of this service, taking a forty-two cell battery as the basis, with the cost for forty-four cells slightly more and that of forty cells slightly less, is as follows:

Forty-two cells—11 plates	$ 8.02	per month
Forty-two cells—13 plates	9.00	per month
Forty-two cells—15 plates	9.90	per month
Forty-two cells—17 plates	11.15	per month
Forty-two cells—19 plates	11.33	per month
Forty-two cells—21 plates	11.78	per month
Forty-two cells—23 plates	12.75	per month
Forty-two cells—25 plates	13.78	per month

Here, then, is a development of tremendous money importance to the pleasure car owner, to the commercial car user and to the electric vehicle manufacturing industry.

How is such service, at such low figures, accomplished?

The first requirement is, of course, an exhaustive knowledge of batteries, of battery development step by step to the present day and of their possible further development. The next is purchasing power, by which plates and all mechanical parts can be bought or manufactured.

For manufacturing purposes the Knobloch concern is now acquiring a factory in which parts are to be made by wholesale lots, as under no circumstances is an electric owner to be told that his machine must be inactive until a part can be replaced by purchase from the parts maker. Parts will, of course, be purchased from the parts maker where it is advisable to purchase them, but any maker's inability to supply within the hour is not to be advanced as a reason or excuse for delay.

This development, analyzed, simply means that the Knobloch concern is to manufacture all the parts that are in use, for users, instead of specializing either in batteries or any one or more parts, for manufacturers.

The company agrees in its agreement of service to make ready for use again within half an hour any machine protected, or insured, by one of its contracts, that meets with any battery or mechanical trouble short of an accidental smash-up. This is one of the more important considerations, especially to the truck user, and to fulfill it means the manufacturing and purchase of parts in large quantities.

The very essence of the development, however, and the fact that has weighed most convincingly with those owners who have taken advantage of the service, is the rather self-evident fact that the maintenance company stands in a neutral and disinterested position between the owner and service. The maintenance company has no special parts to advance, and in parts manufacturing, it can be seen, it has but one concern, and that is to replace any part that gives trouble, do it quickly, and employ the best steel and the battery parts that have proved themselves capable of the greatest satisfaction. Its business is to give service, keep the car out of the shop instead of in it, and to eradicate for the owner those both irritating and costly delays.

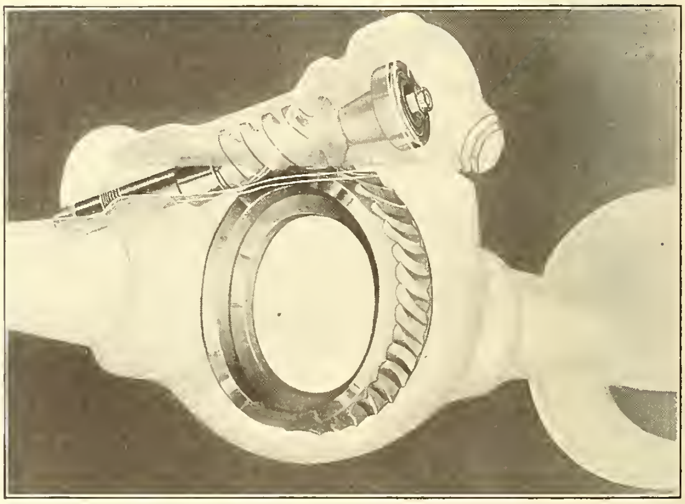
The entire development sums up into that disinterested aspect, plus an expert and experience-gained knowledge of the business in hand, and having the business, in all its departments, under one direction.

The Knobloch company centers at 948-950 West Randolph street, Chicago. Sites for both North and South side branches in Chicago are to be taken as soon as negotiations for acceptable ones can be closed. The South side plant, the company feels, should be between Michigan and Wabash avenues, or in Wabash avenue. A Michigan avenue plant is not desirable because of the commercial car business, though the site must be near "the row" to accommodate the pleasure vehicles. Several locations on Chicago and North avenues, on the North side, are being considered, and it is likely a location on one of these crossing commercial streets will be taken.

Mr. Knobloch is a New York man. Detroit and Cleveland branches of the Chicago plants are to be in operation by or soon after January 1, 1914.

Detroit Electrics With New Worm Gear

For three years the Anderson Electric Car Company has been employing the worm gear axle in some of its cars. As a result of this valuable experience 1914 models of the Detroit electric are fitted with the Daimler-Lanchester worm gear which is acknowledged by eminent consulting engineers in Europe and America as a most efficient worm gearing. It is absolutely silent, perfectly smooth in operation, unusually efficient and very long lived. A new and vastly improved mounting of the worm is applied in the new Detroit electric worm gear axle which is so designed as to insure perfect and positive lubrication. Mounted at the bottom of the axle below the ring gear, this worm runs constantly in a bath of oil—the correct way of mounting.



Imported Worm Drive Used on 1914 Detroits.

Electric Vehicles in Central Stations

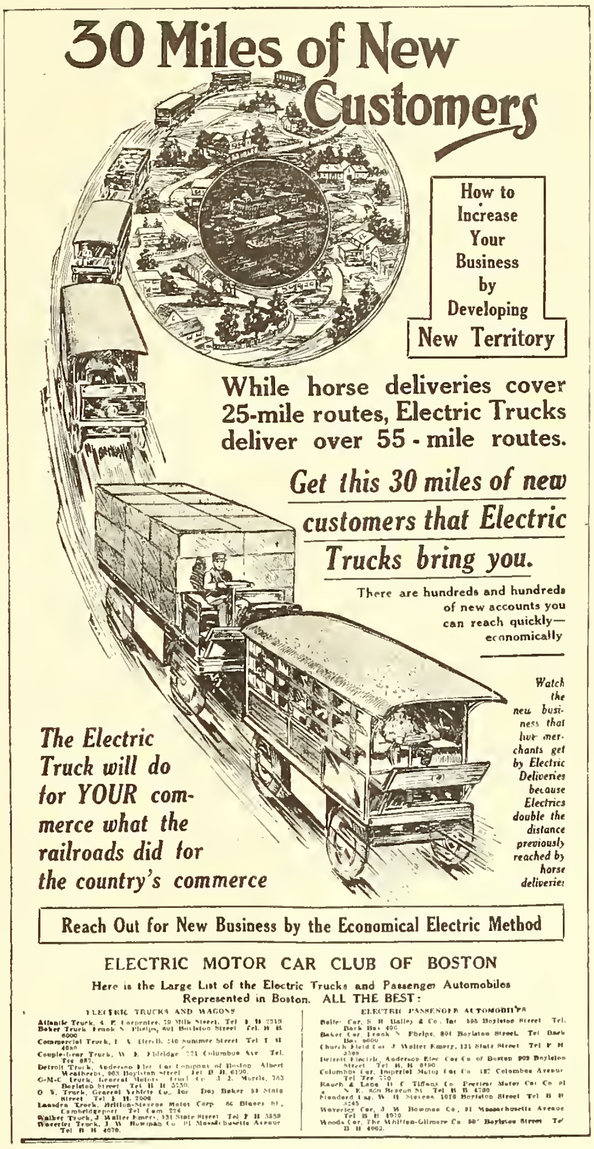
Economics of Their Use for the Station's Own Work

BY J. E. CONKLIN

IT may well be conceded that after ten years' successful employment in economic service the electric vehicle has ceased to be an experiment and is as well developed as most of the industrial apparatus which we are at present using in commercial life as absolute necessities to present day conditions. We may well be convinced of this when we consider that the electric vehicle, particularly in its industrial application, is nothing more than a modification of the electric street car, having the same engineering foundation for its design and production.

With the practical example of nearly 5,000 commercial vehicles and over 15,000 pleasure vehicles in successful employment, there is today considerable wonder that they are not more universally employed, and the conditions tending to obstruct their almost universal application are well worth studying with the object of eradicating whatever impediment there may be and giving such impetus and propagation to their use as to establish in the minds of prospective machine users unquestionable confidence and an inclination to substitute them for the present or existing horse methods with the remarkable reduction in operating expense.

That progress towards their general use is not more active is further accentuated when the four large and powerful influences at work in co-operation to stimulate their employment is considered. These are the makers of the complete vehicles, the manufacturers of the accessory electrical apparatus required in their equipment and of storage batteries, and the public-service companies furnishing current.



30 Miles of New Customers

How to Increase Your Business by Developing New Territory

While horse deliveries cover 25-mile routes, Electric Trucks deliver over 55-mile routes.

Get this 30 miles of new customers that Electric Trucks bring you.

There are hundreds and hundreds of new accounts you can reach quickly—economically

Watch the new business that live merchants get by Electric Deliveries because Electrics double the distance previously reached by horse deliveries

The Electric Truck will do for YOUR commerce what the railroads did for the country's commerce

Reach Out for New Business by the Economical Electric Method

ELECTRIC MOTOR CAR CLUB OF BOSTON

Here is the Large List of the Electric Trucks and Passenger Automobiles Represented in Boston. ALL THE BEST:

ELECTRIC TRUCKS AND WAGONS

ELECTRIC PASSENGER AUTOMOBILES

Example of Co-operative Newspaper Publicity from Boston.

A general inspection of the progress made so far shows that up to September 1, 1913, there had been put into service over $75,000,000 worth of electric vehicles. Incidentally, the total annual current consumption for this equipment will be over 65,000,000 kilowatt-hours and if this latter may be valued at four cents it would represent $2,600,000 annual revenue to electricity supply companies if it were possible to serve this entire equipment from central stations.

A peculiar feature of the increasing business, however, is the fact generally admitted that for the past two years nearly 70 per cent of the commercial vehicles placed in service was purchased by firms already using electric trucks, so that the gain in new business secured by manufacturers represents only about 30 per cent of their total output.

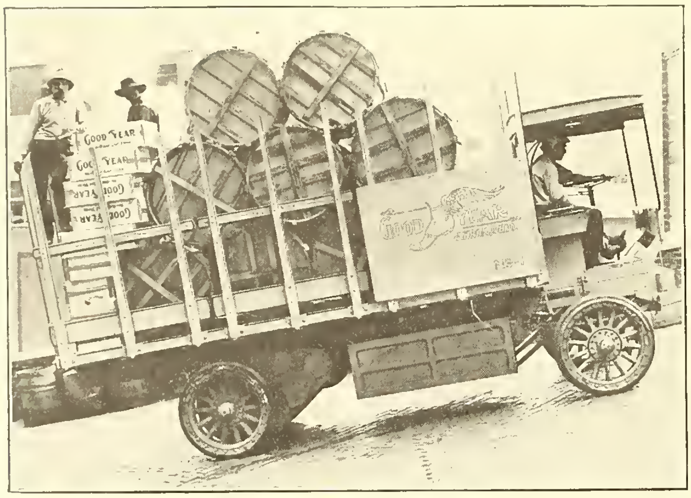
This indicates two things, which are somewhat difficult to reconcile. One is that this type of machine is so economically successful as to warrant continual increase in the equipment already in use, and the other contrasting feature is that notwithstanding this convincing example to the industrial and mercantile community it does not create a proportionate desire on their part to avail themselves of this economical apparatus.

Notable among the recent increases of established installations has been the addition within a few months of about 200 machines to the brewing industry and 200 machines to the express business, with the expected addition within the next six months of 200 more machines to the brewing business and 500 machines to the express line. This indicates that those organizations in which transportation is a serious and important part of their daily business have recognized the utility and economy of the electrics and are superseding as fast as they practically can their existing horse equipments.

While much has been done by central-station companies to promote the wider use of electric vehicles, the value of the battery charging load is not so universally appreciated as its importance warrants. Assuming, however, that every supply company is cognizant of the desirability of co-operating in advocating electrics and in many cases must take the initiative in establishing them locally, there are several problems that must be analyzed.

In the first place, of what shall consist a department organized for the promotion of the use of electric vehicles? From the experience obtained in other special lines of work promoted by the central station, such as lighting and power-current sales, it has been found that he made the best salesman who was best equipped technically, as well as commercially, to handle the subject. At the present time it is the practice in the larger central-station companies for a power solicitor to be thoroughly equipped with technical knowledge. He should, however, have draftsmen and testers whose function it is to relieve him of the work of making engine tests, preparing plans and working up the engineering data. This is essential in order to relieve the solicitor of much of the detail work. The practice in vogue in the power business must be applied in developing the electric vehicle field. Consequently, in the organization of a department, beginning should be made with a salesman sufficiently well equipped to engineer any proposition with which he may come in contact. The central station has aided materially in the production of higher efficiency in all branches of business. Its service is used for light and power purposes by the very manufacturing and business houses in connection with which electric vehicles may be used to advantage and with higher economy than any other form of transportation.

It is generally acknowledged that a central station vehicle department should retain the services of what is negatively termed a trouble man. His duty is to respond to any call for trouble, diagnose the case, and either correct the deficiency or else give positive information as to the nature of the trouble. How far the activity of this man should go towards actually correcting any trouble is a point to be determined.



Baker Truck, 3½ Ton, Used by Goodrich Tire Company for Testing Tires in Actual Running.

In the early stages of a campaign for electric vehicles one such man would probably be sufficient, though it would not be long before the services of one man would be so completely taxed as to require assistants.

Co-operation with the electric vehicle company's salesmen should be much more in evidence than it is at present. These salesmen should be made familiar with the policy of the central station in the territory in which they operate, and should be advised in regard to rates, etc., so as to permit of their making statements that would be confirmed by the central station.

Another problem confronting the inauguration of such a department is the matter of advertising. Considerable advertising has yet to be done before the public is fully educated to the advantages of the electric vehicle. Of course the central-station advertiser has many different lines to which he must devote his attention. Spasmodic reference to electric vehicles is just as ineffective as spasmodic advertising of other kinds. It therefore becomes a problem of considerable outlay and one to be seriously considered. In Boston, Mass., there is now being worked a co-operative advertising scheme in which the local central station and the various agencies in Boston share. A specimen of this co-operative advertising is shown herewith.

One of the first requisites for the building of an electric vehicle business in any city is the establishment of properly equipped garages. Garages improperly or poorly equipped, or in charge of inefficient and careless attendants, act as a decided setback to progress. It is naturally difficult to get anyone to open such an establishment before there is a demand for it, and vehicle salesmen consequently look to the central station for the inauguration of such facilities.

It has been suggested by automobile manufacturers and agents that the central station should install in its generating and substations charging apparatus. This combination of substation and charging station may be desirable, but it is seldom that the substation zone corresponds with the charging station zone. The substation is usually located as near as possible to the center of its load. This center may not coincide with the point which might be called the auto charging center. For efficiency reasons the generating stations are usually located on the water fronts, some distance from the business centers, and are usually, from an auto-charging standpoint, remotely located.

In several cities the central station has made the investment in a large, well-equipped garage, and after a few years it has become a paying investment. These experiences demonstrate the possibility of the public service company in every large center making such an investment a profitable one. The question arises, however, for the largest of our cities, whether the installation of a single electric vehicle station would meet the demand. Some of our cities have areas as high as 125 square miles, and even if such a station could be located in the geographical center there would be many who would have to travel miles to get attention; in fact, the class who would make the most use of such an establishment—that is, pleasure-car owners—would probably have to make the longest run from their homes to such a center. If one garage would not be sufficient, how many would be necessary, and would the returns increase in proportion to the number of such stations?

One of the greatest influences that can be brought to bear on the advancement of the electric vehicle is the attitude of the central-station company in using these vehicles in its own service. If public-service companies with their tremendous capacity and broad influence would stand behind the vehicle manufacturers by purchasing electrics for their own use and recommending them to the public, such an impetus would be given the industry that any advantage the gasoline manufacturers may possess due to their having secured at an early date a more general adoption of their product would be overcome, the position of the electric manufacturers would become independent, and central stations would continue to receive their reward for years to come.

In this connection it is interesting to note what advances have been made by progressive central stations alive to the possibilities offered by the electric vehicle. A canvass was made by an organization interested in the work, among the prominent central stations. Of the 67 companies reporting, in answer to requests for information, 49 have in use 73 passenger and 371 commercial electrics, while 18 of the central stations use no electrics at all; and yet, in the territory served by these 18 companies, there are 68 electrics in use by the public. This would indicate that in some, if not in most territories, the public appreciates the advantages of electric transportation to a greater degree than the central stations which are supplying current for their operation.

There are a total of 272 passenger and 100 commercial gasoline machines and 993 horses being used by the reporting companies, a large percentage of which will be replaced by electrics in the near future. Within the territory represented by this report there are 11,044 passenger and 2,619 commercial electrics in service aside from those in use by the central stations. This is a very credible showing, considering the small amount of energy exerted in this direction up to the present time, but hardly a start when we realize the great possibilities in this diretion and the benefits to be derived from a moderate amount of effort exerted in educating the public to an appreciation of the superior advantages of the electric.

In New York the New York Edison Company uses 123 electrics, four horse wagons and one gasoline car. A saving of 25 per cent over other methods of transportation is realized by the electrics, in addition to the better service rendered. The company reports "large expansion absolutely certain."

The Rochester (N. Y.) Railway & Light Company uses 55 electrics, one horse for handling poles on vacant lots and one gasoline car. Speaking of the electric the manager states: "Great saving in electrics—have one man who keeps in touch with the purchaser by an electric until he understands the charging. Expansion of the electric-vehicle business depends entirely on the central station. Believe every cntral station should displace all its horses."

The Commonwealth Edison Company, Chicago, uses 75 electrics, 113 horses and 16 gasoline cars. Statistics show a saving of from 20 to 25 per cent. The policy of the company is to purchase no more horses and to replace present horse equipment with electric vehicles.

The Edison Electric Illuminating Company of Boston employs 50 electrics, 90 horses and 38 gasoline cars. The company advises that a considerable saving is being made in the use of electrics. Passenger cars are used by various departments with entire satisfaction.

The Philadelphia Electric Company uses 40 electrics, 44 horses and 26 gasoline cars. "Much better service by using electrics. There will be a large expansion of the electric-vehicle business."

The Union Electric Light & Power Company, St Louis, Mo., uses 25 electrics, 39 horses and 10 gasoline cars. Electrics will replace horses as rapidly as possible. This company previously maintained two public garages and succeeded in getting the electric firmly established in St. Louis.

The Consolidated Gas, Electric Light & Power Company, Baltimore, Md., uses 24 electrics, 85 horses and 17 gasoline cars. The company maintains a public garage and has the agency for a commercial vehicle.

The Denver Gas & Electric Light Company uses 21 electrics, 14 horses and 3 gasoline cars. Company maintains an electric vehicle department and publishes a monthly magazine devoted to electrics. "Our idea was not merely to advertise electrics by installing them in our own service. The whole matter was carefully gone into before electrics were purchased and an actual saving in our transportation department demonstrated."

The Public Service Electric Company, Newark, N. J., uses 20 electrics, 35 gasoline cars and 150 horses. Very satisfactory service is reported from the passenger vehicles, and the commercial vehicles are doing the work of from two to three horse units.

Mme. Gadski's Electric a Prize Winner

The leadership of American made electric cars is recognized the world over. Europe has encouraged the American type to compete and, in appreciation of its superiority, the American electric has been granted the first prize.

Mme. Johanna Gadski, the famous operatic singer, during her recent tour of the United States became particularly interested in the electric car, especially due to the fact that everywhere in American cities she found our ladies driving their own electrics with perfect ease and confidence. The idea appealed strongly to the great singer, who takes readily to new ideas and who has always had a liking for things of American manufacture. As a result of her appreciation she purchased a car from the Woods Company. While passing through the German city of Zappot during the athletic sports week Mme. Gadski was induced to enter her car in the Zappot Auto Show. At madam's suggestion the car was decorated with roses. A large white dove, placed in the front, seemed to act as a symbol of international peace between the contestants, representatives of manufacturers from all parts of the world. A clef and bars, the notes of which were constructed by roses inverted, seemed to symbolize the artistic nature of the singer.

Mme. Johanna Gadski at a German Festival with Her Woods Electric.

"To her great joy," writes a friend, "she was awarded first prize over the eighty other cars in the competition." The prize, a large bowl on an ebony stand, will be placed among Mme. Gadski's other artistic trophies.

Rubber for Tires

The automobile industry has created such a constant demand for tires that the tire industry alone, it is claimed by men who follow the rubber trade, today consumes as much rubber as was the world's total supply of crude rubber 15 years ago. Furthermore, of the entire supply of crude rubber, the tire industry uses a liberal 40 per cent. The 1913 crop is figured at approximately 108,000 tons, 45,000 tons of which will be consumed by the automobile field.

The Davis Hosiery Mills of Chattanooga, Tenn., has recently placed a Baker electric one-ton truck in service. It is doing good work and they are well pleased with it. Frank Fairweather closed the deal.

Heat Treatment of Leaf Springs

A Paper Read at the Summer Meeting of the Society of Automobile Engineers

BY E. F. LAKE

UP to the present time the heat treatment of leaf springs has received very little attention from the automobile engineers and metallurgists. If such moving and wearing parts as the gears, shafts, steering knuckles, etc., were hardened and tempered in the same crude, unmechanical and non-scientific manner, the automobile would never have reached the successful position it occupies today. While it is true that many of the new grade alloy steels have been made into springs for commercial use, they give but little better service than carbon steel springs. This is due almost entirely to the wide variation allowed in the hardening and drawing temperatures of the same lot of spring leaves. In fact, here accuracy in heat treatment is almost unknown. Yet heat treatment is what makes the transmission and differential gears give such good service in such small units. Carbon steel springs accurately heat treated often show better results in the various tests than the average commercial spring made from alloy steel. Sample springs have been exhibited that withstand some wonderful tests when made from the alloy steels, but these are only wonderful because of the poor quality of the commercial product. No such wonderful results are shown in sample gears, because the commercial product is uniformly and accurately heat treated, and the samples cannot be made much better than the daily output. When they are properly heat treated the strengths, wearing qualities and especially the resistance to stresses are so much greater in the alloy than in the carbon steels that springs made from the former should be much lighter, i. e., have fewer leaves or thinner plates. Yet such is seldom the case, rarely enough to be called an exception. When not properly hardened and tempered the alloy steels are but little better than the carbon steels as they are very susceptible to heat treatment, which must be done accurately and uniformly if strength and longevity are to be developed. The last statement also applies to the carbon steels, but not to as great a degree.

Much data and many useful formulæ have been brought forth for designing automobile springs, but these cannot be used to advantage unless the spring plates have been correctly hardened and tempered. One writer gives 96,000 pounds per square inch as the factor to use for the elastic limit of carbon spring steel and then compiles a set of tables that uses but 50 per cent of this, in order to allow a factor of safety for what he terms the jounce load. This brings the elastic limit down to figures that can be obtained on thoroughly annealed carbon spring steels, i. e., those with a carbon content of from 0.80 to 1.00 per cent. The 96,000 pounds makes considerable of an allowance for a factor safety on such a steel, when it is correctly heat treated, as then the elastic limit should be 150,000 pounds per square inch. On top of this, however, but one-half of the 96,000 pounds is used to allow another factor of safety for the so-called jounce load. Springs made by the crude hand methods that have formerly been used, doubtless require this double factor of safety in design, as accuracy in heat treatment is impossible and thus a uniform temper is not obtainable in two plates of the same spring or even in two places on the same plate.

VARIATION IN TESTS.

In numerous cold bend tests of spring plates that were made for springs on high-priced automobiles I have had the breakage occur on one end of the plate when it was bent 15 and 20 degrees around a 2-inch pin, while the other end would bend from 85 to 90 degrees without a breakage. This has occurred in springs made in both Europe and America by firms of a high reputation for quality. Likewise, in tensile tests the elastic limit has varied from 85,000 to 155,000 pounds in different parts of the same plate and in different plates in the same spring. Fatigue tests have shown even greater variation than these, as the highest figure obtained has frequently been from six to ten times that of the lowest figure and in a few cases even more. The last named is really the important test for springs, as it shows their length of life, or resistance to alternating stresses.

HEAT TREATMENT.

Spring steels in the softest annealed state have considerable of an elastic limit and will spring back if not strained beyond this. Thus it is possible to pile enough plates of this material on top of one another to make a spring that will carry any given load. This fact has saved many a designer from utter failure when the heat treatment was poorly done. Lightness of parts, however, has been the great factor in the success of the automobile. To get the lightest spring that will carry a given load it is necessary to put the steel in a condition that will give the greatest resiliency and longevity of which

Wise Man's Choice

There was a man in our town and he was wondrous wise; he bought an automobile, his family to surprise. The auto it stopped running and caused him great alarm; he hurried out to crank it and straightway broke his arm. He purchased a self starter (electrical device) that saved his bones and temper and made it very nice. He bought a lighting system so the mudholes could be seen; but he straightway broke his bank account on bills for gasoline. Then he was sore, and started out to burn the road a plenty. "You broke the law," the judge then said, "and it will cost you twenty." So then he started home again; his rage it was intense. He turned a corner on two wheels and straightway broke a fence. He took the auto to his wife and said, "My dear, you use it."

"I'm no mechanic," said Friend Wife, "and so I must refuse it. To all these gimcracks and doodads I will not be a martyr. The only part I understand is that electric starter."

"Aha!" he cried, "I see a light!" And then he rushed away to learn the difference between a brougham and a coupe. He looked for an Electric with plenty of ignition, six cylinders and water-cooled, to run by intuition. The salesman smiled and showed him how the buttons should be pressed. He could look out the window and the car would do the rest. So now Friend Wife is happy and he is happy too; for when they want to ride, they ride—that's all they have to do.

the metal is capable. This can only be done by hardening and tempering the spring plates to accurate predetermined temperatures. Automobiles travel over rough roads at from three to ten times the speed of horse-drawn vehicles and consequently put much more severe and frequent strains on the springs. Nearly all of these springs, however, are made by the same crude hand methods that were employed for the manufacture of carriage and wagon springs, which were made in anything but a scientific and mechanical manner. The usual method employed, as far as the heat treatment is concerned, is to have a spring fitter and his helper work at a furnace in which the temperature is supposed to be kept at 1,800 degrees Fahrenheit. Into this the spring plates or leaves are laid until they absorb the temperature of the furnace. Each plate in succession is then taken out and by the use of pincers the two men make it conform to the shape of the next larger leaf. The spring leaf is next put back in the furnace to heat it to the hardening temperature and is then quenched in oil. After this it is again put in the furnace until the oil flashes or burns off; this is called tempering.

The correct hardening temperature for most of the spring steels is about 1,500 degrees Fahrenheit, although some of the alloys require as high as 1,650 degrees. With the furnaces running at a temperature of 1,800 degrees it is a physical impossibility for the men to heat all the plates in a day's work to this 1,500 degrees unless the work is done so slowly as to make it unprofitable. Even then the difference in the light in the shop, caused by clear sunshine and a sun obscured by dark clouds, will alter the man's judgment of this temperature more than 100 degrees, as it must be judged by the eye. Furthermore, most spring plates are tapered at the ends and the thin ends will absorb the heat faster than the central portion and these will have different temperatures when the plates are quenched in oil. Pyrometer systems have been installed, but with this method of hardening they are only talking points, or advertising features, as the pyrometer gives the temperature of the furnace and not that of the steel inserted in it for hardening. In many cases the pyrometers are not calibrated or tested for months at a time and often the readings are 200 or 300 degrees from the correct one.

Bailey and G. V.—Prize Winners at Summit, N. J.

The hotter the spring plates are made the easier it is to pinch them to shape by the hand method and as the spring fitter and helper work on the piece-work system it is a great temptation to raise the heat in the furnace. Thus the 1,800 degrees often becomes 2,000 or 2,200 and even more. This makes it still more difficult for the hardening temperature, 1,500 degrees, to be properly judged. I have many times seen cast iron tubes with the end placed in the furnace to protect the thermo-couple of the pyrometer, melted off. Sometimes the spring plates are taken from the furnace, pinched to shape and quenched in oil without ever returning them for the hardening heat.

Many other things might be brought forward to show the impossibility of obtaining accuracy in the hardening temperatures by this method. The facts are, however, that a variation of 300 degrees occurs in the hardening temperature of the spring plates quenched in a day's run in the best regulated shops. Any kind of a test that is applicable will show such a variation in the strength, resistance to strains or longevity of the steel as to make it a misnomer to call such springs heat treated.

To those who understand heat treatment methods it sounds much like a huge joke to be told that the temper is drawn by putting the quenched-in-oil spring plates back into the furnace to burn the oil off. The oils that are used for quenching have a flash point of from 400 to 600 degrees Fahrenheit, which in conjunction with a furnace heated to 1,800 degrees, makes it impossible to keep within 100 degrees of the desired drawing temperature. For the different kinds of spring steels the drawing temperature ranges between 700 and 900 degrees. The correct temperature for drawing a given steel should be obtained and a variation of more than 10 degrees from this point not be allowed. With the materials and apparatus now obtainable spring plates can be tempered all day, and every day, with a smaller variation than this. It can also be done more quickly and cheaply than by the old hand methods.

A very decided change takes place in the strength, toughness and longevity of spring plates with each change in the temperature at which they are hardened and drawn. This is why it is necessary to heat treat them with no variation from the temperature which gives the best results. As steels are quite brittle in their hardest state a part of the hardness is drawn out to increase the toughness and prevent breakage in such parts as springs. In the hard state the steels have their greatest elastic limit and some of this must be sacrificed to acquire the toughness needed for the proper resiliency of the spring. Every rise of 100 degrees Fahrenheit in the drawing temperature lowers the elastic limit by something like 20,000 pounds per square inch, in the case of ordinary carbon steels, and more than this in the case of alloys. Therefore, to carry the drawing temperature beyond the point where the desired toughness is obtained, weakens the spring in exact proportion to the number of degrees the temperature is raised. This means putting just that much more steel into the spring to prevent it from settling under its load. On the other hand, if the drawing temperature is below the point where the desired toughness is obtained, breakage of the spring is liable to occur from too much brittleness or loss of resiliency.

Exact hardening temperatures are even of more importance than the drawing temperatures. Spring steels will not harden unless they are heated to a few degrees above the transformation point and then cooled suddenly. From 25 to 40 degrees above this point is usually allowed for the loss or lag when quenching. Tests of leaves from stock springs have shown that many of them were quenched at too low a temperature, they were too soft to have proper resiliency and settled when on the car.

When hardening spring plates, heating to temperatures too far above the transformation point has probably been the cause of more trouble than any other one thing. This is easily and often done when the furnace temperature is several hundred degrees higher than the correct hardening temperature and such is usually the case. At the transformation point a new grain structure is born, the finest that can be produced in the metal. The steel is in its densest and strongest condition. Each degree that the temperature of the steel is raised above this point adds to the coarseness of the grain; when the temperature is raised high enough the grains crystallize and distinct cleavages occur between them. Thus strength and resistance to strains are gradually reduced with each rise in temperature above the correct one for hardening.

Fatigue tests have shown that the number of alternating vibrations which a spring leaf will withstand before breaking was reduced 20 per cent by having the hardening temperature 50 degrees too high. This means that when placed on a car the spring would last only four-fifths as long as one correctly hardened. With the hardening temperature 100 degrees too high, the number of vibrations was reduced 33 per cent or one-third of the spring's life was sacrificed; 150 degrees, 45 per cent. The elastic limit of the steel also is reduced in similar proportions.

Detroit Electric Demonstrator Drives His Car Up the Steps of Logan Monument, Chicago.

With the old hand method of manufacturing such springs as indicated above are being continually turned out and put on cars, and no better work can be expected. The man does not exist who can quench plates all day and keep them all within 100 degrees of the correct hardening temperature. I have seen the elastic limit in different parts of the same spring vary from 85,000 to 145,000 pounds per square inch.

Crystallization is often found in spring plates. This cannot occur except from the heat treatment that the steel received. The statement has often been made that crystallization is produced by rapidly bending the steel back and forth; or, in other words, submitting it to the alternating vibrational strains which a spring receives in service. No such change ever takes place, however, as the grain is enlarged or coarsened before crystallization takes place, and this is caused only by overheating. Thus, if crystallization is found at the break in a spring plate, no other excuse can be given; it was heated to too high a temperature, either when hardening or when bending the eye or rolling the tapered ends. The first sign of weakness from vibrational strains is the starting of one crystal to slide past another, with absolutely no increase in the size of the crystals or grain. This continues until a slip plane is established clear across the piece and breakage occurs.

If leaf springs had been investigated as thoroughly as other parts of the car and as much scientific and mechanical knowledge had been applied to their manufacture, breakage and settling of the springs would have been exceedingly rare. They would outlive the car. By forming the spring plates in a machine, instead of by hand, they can be bent to shape without overheating them to 1,800 or more degrees, as is now the custom. A temperature around the transformation point is all that is necessary as the machine is stronger than men's arms. They can then be taken to hardening and tempering furnaces that maintain the correct temperatures for this work and left in these until they absorb the temperature of the furnaces when they can be quenched or cooled with an assurance that the steel will not be overheated, crystallized and weakened.

Pyrometers can then be used successfully to measure the heat, provided they are tested every day, as the temperature of the furnace will be that which is required in the steel. This accuracy will enable the designer to make the springs lighter, and it can be obtained with less cost than by the old hand method. Some might think that this would revolutionize the manufacture of leaf springs, but it is only a change that is based on mechanical horse-sense and should have been brought about long ago.

Bailey Roadster Coming to Chicago

W. J. McDowell, Wilmette, Ill., announces that the now famous Bailey roadster will be seen in Chicago at the end of October. This car, equipped with Thomas A. Edison's battery, has made in the East a wonderful record for speed and mileage, and its appearance in Chicago will be eagerly looked forward to by all who appreciate the great advantages of the electric automobile.

A list of some of the runs made by this car on one charge of battery is herewith given, and the high average speed maintained is particularly interesting, as it compares favorably with the speed of gasoline cars:

Boston to Pawtucket and return, 103.2 miles in 5 hours, 7½ minutes; average speed 20.14 miles per hour.

Boston to Springfield, 93.4 miles in 4 hours and 55 minutes; average speed 19 miles per hour.

Boston to Wareham, 58 miles in 2 hours and 47 minutes; average speed 20.8 miles per hour.

Worcester to Boston, 42.6 miles in 2 hours and 1 minute; average speed 21.1 miles per hour.

Boston to Lowell, 25.9 miles in 72 minutes; average speed 21.6 miles per hour.

Brockton to Boston, 21.8 miles in 65 minutes; average speed 20.2 miles per hour.

Hartford to Springfield, 26.9 miles in 77 minutes; average speed 21.0 miles per hour.

Electrics at the New York Motor Show

Some Features of the Annual Event Planned to Interest Vehicle People

BY HARVEY ROBINSON

THAT electric vehicles will play a more prominent part than ever in New York Electrical Show this year is evident from the fact that the exhibition has been officially designated as the Electrical Exposition and Motor Show. As usual, the display will take place at Grand Central Palace, the dates selected being from October 15 to 25.

One of the features so far arranged is a model garage for the storing and maintenance of electric vehicles. The garage will be erected on the third floor and will be conducted in conjunction with the automobile track. It is expected that a great deal of interest will be added to the automobile end of the exposition by the establishment of this new feature, all details of which have been worked out by special committee composed of members of the New York Electric Vehicle Association.

According to the secretary of the committee, arrangements have been made with Andrew Gries & Company to construct a metal fireproof garage on the third floor of the Grand Central Palace. Arrangements have also been made with the General Electric Company and the Westinghouse Electric Company for the installation of mercury arc rectifiers and charging boards and with the Wagner Company for the exhibition of a Wagner converter.

The building will be equipped exactly as a city garage should be fitted out. An electric display sign and a danger sign will be erected in front and vacuum cleaners, polishing motors, electric tire pumps and patented car washing devices will be maintained within. Visitors at the show will have an opportunity to see all these up-to-date contrivances in action, for the garage will be the storeroom for exhibitors' cars used for demonstration purposes on the automobile track. An effort is being made to have each company detail a corps of men for demonstration work and the Electric Vehicle Association has arranged to have a special staff of demonstrators on the floor.

Connected with the garage will be a model repair shop and a model battery room. The shop will be equipped with an exhibition of lathes, presses, drills and all sorts of electrical appliances for use in automobile repair work, supplied by the United States Electric Company. The battery room will be furnished with complete sets of batteries loaned by the Philadelphia Storage Battery Company, the Electrical Storage Battery Company, the Gould Storage Battery Company and the Edison Storage Battery Company.

Aside from the space occupied by the garage and a special parking space for exhibitors' cars, most of the third floor of Grand Central Palace will be occupied by the automobile demonstration track. The course will cover one hundred yards in the shape of an oval and will be surrounded by heavy brass guard rails. Arrangements have been made to construct a platform in the center of the oval, which will be occupied by an orchestra.

Demonstrations will be conducted on the track and some time during the show week Gymkana races will be held, in which pleasure cars will participate.

The special committee of the New York Electric Vehicle Association in charge of the automobile exhibition is composed of E. W. Curtis of the General Vehicle Company, J. H. Cafferty of the General Motor Truck Company, Nathaniel Pratt of the Baker Vehicle Company, S. W. Menefee of the Anderson Electric Car Company, C. Y. Kensworthy of the Rauch and Lang Carriage Company, Charles A. Ward of Ward Motor Vehicle Com-

John R. Thompson's Commissary in Chicago Has a Fine Fleet of G. V. Trucks.

pany, W. R. Chandler of the Holt Chandler Company, W. C. Poertner of the Poertner Motor Car Company, J. M. Barrett of the Automatic Transportation Company, Harvey Robinson of the New York Edison Company, and H. C. Fling of the New York Electric Vehicle Association.

Society Woman Becomes Agent

Recently Miss Leonora Rice of Little Rock, Ark., became interested in motor cars and very naturally that interest turned to the electric as an ideal car for women. Her desire to own an electric grew until she resolved to make the purchase of a car. Miss Rice was so pleased with her new Woods electric that she decided to accept the agency for the Woods and devote the greater part of her time to demonstrating the machine to her many friends in the best social circles of Little Rock.

Miss Rice is not only the first woman automobile agent in Arkansas but is also the first woman in the United States to procure an agency for the Woods electric.

Confident of her success in her venture, Miss Rice has already practically sold several prospects. Miss Rice was appointed sole agent for the Woods in Little Rock, after weeks of investigation by factory representatives, who feel so certain of her success that it is stated she will eventually extend her territory to include the entire state.

"Selling electrics is fascinating work," said Miss Rice. "I enjoy studying the wonderful yet simple mechanism of my car. I am sure it will make a tremendous hit in Little Rock."

Government Electrics on Specifications

"Electric vehicles purchased by the United States government during the next fiscal year—July 1, 1913 to June 30, 1914—will have to comply with rigid specifications, including requirements covering the uniformity and standardization of parts. The government is a large user of electric vehicles, especially those of commercial types, and manufacturers hail with appreciation the new order.

Electric experts in the United States Bureau of Standardization and other departments will prepare the specifications and the purchase of vehicles will be under the authority and supervision of the general supply committee, which was recently created to establish system in buying goods for Uncle Sam.

Four classes of electric vehicles have been adopted for the different kinds of government wagon of service. These are an electric wagon of 1,000 pounds capacity, principally for the postal department, and trucks of 1,500 pounds, two tons, and three tons burden. As these are types of electric cars that the manufacturers have made so successfully for private enterprises, they are glad to find that the government has given them its approval and practically specified them in preference to gasoline vehicles and horses and wagons.

Electric Used for House Lighting

Northboro, Mass., credits itself with having some of the prettiest suburbs in the East. In one of these suburbs W. J. Murch had his house built and wired for electricity. After the house was completed he discovered the fact that electricity was not available in that particular district. In connection with his new home he had a garage built to contain his electric car.

After a mental observation of the power derived from the storage battery in his electric, he conceived the idea of connecting the wires from his house to the battery in the car and using the energy for lighting his house.

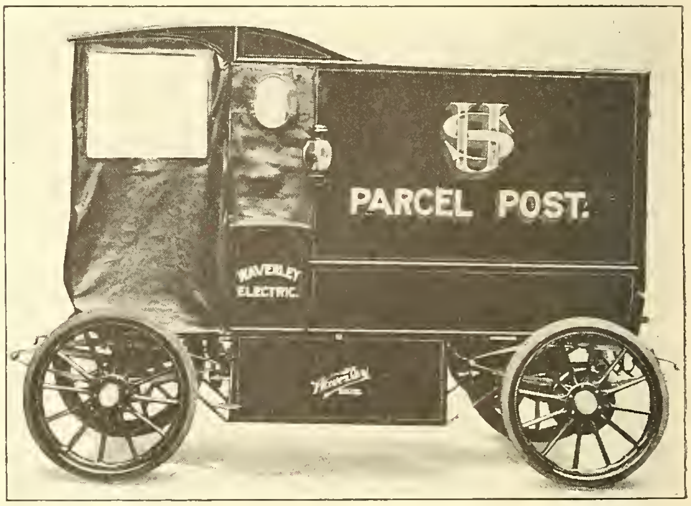
The method proved to be exceedingly efficient in view of the fact that the battery supplies enough energy to light four 16-candlepower carbon filament lamps. The lamps are of the same size as those used in the headlights of his car.

With lamps placed on the piazza, in the kitchen, one in the living room and the fourth in the bedroom, the battery, a standard "Exide," furnishes sufficient illumination for the home.

Electric Milk Delivery Vehicle

The Detroit Creamery Company recently installed a Detroit electric one-ton commercial car for its route through the aristocratic Grosse Point district, eleven miles from Detroit.

The special body possesses a great many features devised particularly for milk delivery service. The sills and side-risers are protected with copper so as to eliminate wear and decay. Windows are plate glass. The interior is equipped with dome lights for the help of drivers and night workmen. The painting is pure white Vitrolite which does not need varnishing and the yellowish tinge that usually comes to white paint with age is eliminated. The lettering is gold leaf pencil varnish.



Waverley Electric Used in Parcel Post Work at Indianapolis.

The wheelbase of this car is 84 inches, tread 58 inches, tires 32x3 front and 34x3½ rear. Speed twelve miles per hour. Mileage radius, fifty-five miles loaded. Battery equipment, 60 cells A-6 Edison.

A Novel Wheel Rim

Victor Lindholm of Hoquiam, Wash., has patented No. 1,063,888, a wheel rim, one flange of which has an entrance opening, which can be closed by suitable means provided for that purpose. The tire is composed of a series of sections of wire rope inclosed in a rubber casing and bent longitudinally to conform with a conventional tire with the sections held at their ends in tubes which can be slipped through the lateral opening in the rim flange and then adjusted to suitable position, so that the tire will be composed of a number of these sections resting side by side and extending thus entirely around the rim of the wheel.

E. V. A. Constitution and By-Laws

What the Association Means to Those Interested in Electric Vehicles

THE Electric Vehicle Association of America needs and should have the support of every manufacturer, central station and accessory concern. Everyone interested in the welfare of the electric vehicle industry, in fact, should join it. We print below the constitution and by-laws of the association for the information of those interested:

CONSTITUTION

ARTICLE I.

Name

This Association shall be known as the "Electric Vehicle Association of America."

ARTICLE II.

Object

The object of this Association shall be to promote the adoption and use of electric vehicles for business and pleasure purposes.

ARTICLE III.

Membership

SECTION 1. The membership shall be divided into five classes —active members, auxiliary members, press members, associate members, and honorary members.

Active Members

Active members shall be corporations, firms or individuals engaged in the manufacture and sale of electric vehicles, electric vehicle batteries, or electric motors, and corporations or firms engaged in the sale of electric current.

Each active member shall designate one individual who shall act as its official representative.

Official representatives only shall have the right to vote.

Auxiliary Members

Auxiliary members shall be corporations, firms, or individuals engaged in the manufacture or sale of electric controllers, tires, or electric vehicle accessories.

Auxiliary members shall be entitled to all the privileges of active members of the Association, except the right to vote.

Press Members

Press members shall be corporations, firms or individuals publishing trade papers.

Press members shall be entitled to all the privileges of active members of the Association, except the right to vote.

Associate Members

Associate members shall be employees or representatives of active, auxiliary or press members and corporations, firms or individuals owning, or engaged in operating electric vehicles, or garages, and any persons interested in the development of the electric vehicle and who are not eligible to active, auxiliary or press membership.

Associate members shall be entitled to all the privileges of active members of the Association except the right to vote.

Honorary Members

Honorary members may, upon recommendation of the Board of Directors, be elected by a majority vote of members present at any annual meeting.

Honorary members shall be entitled to all the privileges of active members of the Association, except the right to vote.

SECTION 2. Application for membership, other than honorary, shall be signed by the applicant and endorsed by at least two members in good standing and presented to the Secretary. Election to membership shall be by a majority vote of the Board of Directors.

ARTICLE IV.

Annual and Special Meetings and Elections

SECTION 1. The annual meeting of the Association for the election of a Board of Directors and Officers, and the appointment of three inspectors of election and for the transaction of such other business as may come before the meeting, shall be held on the second Tuesday of October in each and every year at such place as may be decided upon by the Board of Directors.

Notice of meeting shall be mailed at least one month prior to such meeting to each member at his last known address.

The election of directors and officers shall be by written or printed ballot, and the candidate receiving a majority of the votes cast shall be considered elected.

SECTION 2. Regular meetings of the Association may be held at such time and place as may be designated by the Board of Directors, notice being mailed to each member at least one week before such meeting.

SECTION 3. Special meetings of the Association may be called at any time by the President or by a majority of the Board of Directors, and shall be called by the Secretary, upon the written request of ten (10) members, specifying the purpose of such call. At such special meetings no business shall be transacted, except such as shall be specified in the call thereof. Notice of special meetings shall be mailed at least one month before the meeting, to each member at his last known address.

SECTION 4. At each annual meeting of the Association there shall be elected a Committee of five (5) members of the Association who shall nominate candidates for the Board of Directors and for the Officers of the Association. The names of such candidates shall be posted by the Secretary of the Association in a conspicuous place where the annual meeting of the Association is being held, at least two hours before the election of directors and officers shall be in order. Any five members of the Association may nominate other candidates for all or any of such offices, and the names of all such candidates so nominated shall be posted by the Secretary of the Association, in the same manner, at least one hour before the election of directors and officers shall be in order. No person shall be elected whose name is not so nominated, unless no nominations are made by the nominating committee as hereinbefore provided, in which event any member of the Association may be elected.

SECTION 5. Inspectors of election shall be chosen by ballot at each annual meeting of the Association or by the Board of Directors at any meeting thereof. They shall act as inspectors and receive and canvass all of the votes by ballot at all of the meetings of the Association, held after their election, until the close of the next annual meeting. In case for any cause any of the inspectors shall fail to attend or serve, the Association at any meeting, or the Board of Directors at any meeting, shall choose the requisite number of temporary inspectors so that there shall be three inspectors to act at such meeting.

SECTION 6. At every election of directors or officers, the polls shall be kept open from 12 noon until 2 p. m. for the reception of the votes, unless the votes of all the members have been previously cast.

SECTION 7. Vacancies in the Board of Directors or in the offices may be filled, until the next annual meeting, by a vote of the majority of the Board of Directors remaining in office.

SECTION 8. Meetings of the Board of Directors shall be called by the President or upon written request of three (3) members of the Board. Five members shall constitute a quorum.

ARTICLE V.

Officers, Directors, and Their Duties

SECTION 1. The officers of the Association shall be a President, a Vice-President, a Secretary and a Treasurer. The offices of Secretary and Treasurer may be filled by one person. The officers shall be elected from the members in good standing at the annual meeting to be held on the second Tuesday of October in each year. Elections shall be by ballot.

SECTION 2. The President, or in his absence the Vice-President, shall preside at the meetings of the Association and of the Board of Directors.

SECTION 3. The Treasurer shall collect all revenues of the Association, shall keep its accounts and report thereon at each regular meeting of the Association. He shall pay bills when approved by the Board of Directors or other agency authorized to incur them.

SECTION 4. The Secretary shall keep the records of this Association and of the Board of Directors, and shall give notice of their meetings. He shall inform the Treasurer of all transfers affecting the membership.

SECTION 5. Each officer shall also perform such other duties as may be assigned by the Association or the Board of Directors.

Section 6. There shall be a Board of Directors, which shall include the President, Vice-President, Secretary and Treasurer, *ex-officio*, and twelve members of the Association, who shall be elected from the active members of the Association.

Section 7. The Directors shall be elected for three years with the exception of those elected at the formation of the organization. The first four named at this meeting shall be elected to hold office until the annual meeting in October, 1911, the second four shall be elected to hold office until the annual meeting October, 1912, and the third four to hold office until the annual meeting October, 1913.

ARTICLE VI

Committees

Section 1. The Board of Directors or the President, with the approval of the Board of Directors, may appoint such committees from time to time with such powers as may be deemed advisable or necessary.

Section 2. Any member in good standing shall be eligible as a member of any committee.

ARTICLE VII

Official Organ

Each active member, auxiliary member, associate member, press member, and honorary member shall receive, without expense, this publication regularly, a subscription price approved by the Board of Directors being included in the annual dues, which subscription will be paid to the publishers of the official organ by the Association.

ARTICLE VIII

Resignation and Expulsion

Section 1. A member may resign, in writing addressed to the Secretary, but his resignation shall not be accepted until all his indebtedness to the Association, including dues for the current year, be discharged.

Section 2. Any member may be suspended or expelled for nonpayment of indebtedness to the Association by a vote of two-thirds of a quorum of the Board of Directors, or for any other cause by a vote of two-thirds of all the members of the Board of Directors; notice in writing stating the ground of proposed suspension or expulsion having been delivered to him or mailed addressed to his last known post-office address fifteen days before. The Board of Directors may rescind any such action and reinstate the member, upon or without conditions, in its discretion.

ARTICLE IX

Amendments

This Constitution may be amended at any regular meeting of the Association by a majority vote of the active members voting. The vote shall be cast by active members present and by those transmitting votes by mail, said amendments having been proposed in writing and read at a previous regular meeting and having been mailed to all active members immediately after said regular meeting.

BY-LAWS

ARTICLE I

Membership

Section 1. Applicants who are duly elected shall become members upon payment of the annual dues, and subscribing to the Constitution and By-Laws.

Section 2. The dues shall be as follows:

Active Members

Section 1. Corporations, firms or individuals engaged in the manufacture and sale of electric vehicles, electric vehicle batteries or electric motors, $50 per annum.

Corporations or firms engaged in the sale of electric current, in proportion to the population of the territory in which they operate, as follows: In territories of 500,000 or over, $50; territories between 200,000 and 500,000, $25; territories between 50,000 and 200,000, $10; territories under 50,000, $5 per annum.

Auxiliary Members

Corporations, firms or individuals, engaged in the manufacture or sale of electric controllers, tires, or electric vehicle accessories, $25 per annum.

Press Members

Corporations, firms or individuals publishing trade papers, $10 per annum.

Associate Members

Employes or representatives of active, auxiliary or press members, and corporations or individuals owning or engaged in operating electric vehicles or garages, and any persons interested in the development of the electric vehicle and who are not eligible to active, auxiliary or press membership, $5.00 per annum.

Payment of Dues. Dues shall be payable in advance on October 1st of each year. The Board of Directors shall have power to adjust the dues of applicants joining the Association at dates not coincident with the beginning of the fiscal year.

Honorary Members

Shall not be required to pay dues.

ARTICLE II

Quorum

A quorum shall consist of fifteen (15) active members.

ARTICLE III

Rules

Roberts' Rule on order shall govern the meetings of the Association and of the Board of Directors, except as otherwise provided for in these By-Laws.

Order of Business

1. Reading of the Minutes.
2. Report of the Secretary.
3. Report of the Treasurer.
4. Report of the Committees.
5. Unfinished Business.
6. New Business.
7. Adjournment.

ARTICLE IV

Branches

Branches of this Association may be formed in centers of local activity. Upon a statement in writing of an active, auxiliary, press or associate member, that at least fifteen (15) active, auxiliary, press and associate members of this Association reside in one locality and desire to organize a branch, the Board of Directors may authorize the formation of a branch. The Association will pay the reasonable expenses of the meetings of the branches, which amount shall be determined by the Board of Directors. The Constitution and By-Laws of all branches shall be subject to the approval of the Board of Directors of this Association.

ARTICLE V

Amendments

These By-Laws may be amended at any regular meeting of the Association by a majority of the active members voting. The vote shall be cast by active members present and by those transmitting votes by mail, said amendment having been proposed in writing and read at a previous regular meeting and having been mailed to all active members immediately after said regular meeting.

Standardization of the Charging Plug

The committee on standardization of the Electric Vehicle Association has under consideration a proposed charging plug of larger size to be adapted for the heavier commercial vehicle. An attempt is also being made to adopt a standard list of lamp bulbs, in order to reduce the number now in use due to variations in voltage ratings and deviations in the bulb shapes. Because of the wide variation in compounds and the effect this has on both the speed and the mileage, the committee is going to take up the question of a standard method of testing rating of solid tires for efficiency. This is an important question and one of the undeveloped factors of the electric vehicle business.

Adopting such standards should result in improving the vehicle as a whole and should bring a more uniform practice in regard to the various attachments and equipment.

Standardization of these features can be brought about without limiting the manufacturers in carrying out their individual ideas. It is thought that the work already done along this line of standardization, as well as that planned for the future, will be of decided advantage to the vehicle manufacturer, the owner, the garage and the central station.

PERSONAL AND BUSINESS NOTES.

R. G. Kagey, traveling representative for the Rauch & Lang Carriage Company, has been appointed to the managership of the new Rauch & Lang Electric Car Company of Kansas City, Mo. Salesroom and service station have been opened at 35th and Main streets of that city. Mr. Kagey is unusually well fitted for his new position, having met electric vehicle conditions from Maine to California and from Winnipeg to Texas. He will be assisted by Philip Ragan, formerly one of the Rauch & Lang representatives at Cleveland, Ohio, and E. B. Bryan of Kansas City. Kansas City has always been an exceptionally good Rauch & Lang town and doubtless the owners will be greatly pleased to know of the incorporation of the new company with Mr. Kagey at its head.

Henry L. Hornberger, 2441 Vallejo street, San Francisco, has been appointed Pacific Coast representative of the Borland-Grannis Company. Until the 10th of July Mr. Hornberger was located in San Francisco as branch manager and Pacific Coast representative of the Oakland Motor Company. His entire attention will be given to the interest of the Borland-Grannis Company and the Palmer-Singer Company, in the Pacific Coast states.

G. L. Morris, formerly manager of the National Cash Register Company, was appointed May 1 as manager of the Boston branch of the General Motors Truck Company. Mr. Morris was one of the most prominent sales managers in the cash register industry and opened up practically every foreign office and also the majority of branches in the larger cities, including Chicago, New York and San Francisco.

The General Motors Truck Company has established a new office of special factory representative. M. E. Brackett has been placed in this capacity. Mr. Brackett having resigned from the Grand Rapids Motor Truck Company on account of a disagreement of sales policy, took the appointment of the General Motors Truck Company on March 1. We understand that the company has established this position in order that the traveling representative may visit all of the branch offices with the idea in view of instructing the branch managers of the sales policies as adopted from time to time by the General Motors Truck Company.

Otto Stoll, one of the foremost men in the truck industry and a man who has been in the employ of the General Motors Company for several years, has succeeded Mr. Johnson as manager of the Philadelphia branch of the General Motors Truck Company. Mr. Stoll was formerly assistant sales manager of the General Motors Truck Company, but after getting married he wished to settle down, and, as a result, the company placed him at the head of the Philadelphia office. Mr. Stoll is well known in electric truck circles and has the reputation of being one of the best informed men in the electric truck industry.

C. B. Warren, formerly sales manager of the Haynes Automobile Company at Kokomo, has succeeded Mr. Taylor as manager of the New York branch of the General Motors Company. Mr. Warren has been in control since the first day of May and he states that his company has met with great success in the East.

L. A. Halley, manager of the Chicago branch of the Motz Tire Company, made a flying trip to Peoria, Ill., Saturday, on business relating to the equipment of several electrics with Motz tires.

C. H. Brook, who was formerly with the Westinghouse Electric & Manufacturing Company at Pittsburgh, Pa., has installed a new garage, the second exclusive electric garage in Hartford, Conn. The garage has been well patronized and the prospect for the future is excellent.

The Willard Storage Battery Company, Cleveland, O., maker of Willard storage batteries, has established a new branch office at 438-439 Indiana Pythian building, Indianapolis, Ind.

The United States Tire Company has broken ground in Baum boulevard, Pittsburg, Pa., for a new service station for its solid motor tire department. A two-story and basement brick building will be erected. The company occupied its present building in October, 1911, and since then the business has grown to such volume that the new structure required will be the largest building devoted to the rubber tire trade in Pittsburg.

The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has just printed a new edition of Bulletin 8540. It contains prices and data on the various types of battery-charging rheostats for both lead and nickel-iron batteries, including wall, floor and switchboard types, and also two styles of automatic rheostats.

The Howe Rubber Company, New Brunswick, N. J., proposes to expand its business and to manufacture automobile tires in connection with its other lines. It will expend $300,000 for new buildings and modern machiney, and the capital stock will be increased.

N. O. Gilbert, one of the best eectric passenger salesmen on Michigan avenue, joined the Chicago retail sales forces of the Borland-Grannis Company on Monday, August 18.

The Peerless Motor Car Company of New England has secured the Boston agency for the Rauch & Lang Company, of Cleveland, Ohio, and will feature the electric vehicles under the direction of J. L. Snow at its headquarters, 660 Beaver street, Boston, Mass. D. C. Tiffany, formerly agent for the Rauch & Lang electric car in Boston, has taken the agency for the Ohio car and will continue service for his electric garage at 136 Chestnut street, Boston.

W. L. Case, vice-president and general manager of the Lansden Company, Newark, N. J., maker of Lansden electric vehicles, has resigned his position and his place has been taken by George E. Blakesley.

A. Otto Hiester, who has been manager of the Buffalo office of the United States Light & Heating Company, and previously with the National Battery Company, has joined the sales force of the Edison Storage Battery Company.

S. N. Cotterman has resigned as director and vice-president of the Broc Electric Vehicle Company and is again associated with the Baker Electric.

Rudolph Schurman has purchased an interest in the electric garage from Wright Brothers, of Fremont, Neb., and will assume the management of the place. The new firm will organize a corporation and will do a general repair business and handle electric cars.

The Kentucky Wagon Manufacturing Company, Louisville, Ky., recently held its annual meeting. W. O. Harris, Jr., and Stuart E. Duncan were elected directors to succeed C. G. Strater and L. Allen. President W. C. Nones was reelected, as were also the following directors: S. M. Nones, John Marshall, John C. Hughes, Bernard Bernheim, P. S. Tuley and James Glazebrook.

A Novel Anti-Skid Device

A patent, No. 1,062,618, has been issued to Thomas Townend of Winnepeg, Manitoba, for an attachment to automobile wheels wherein it is sought to prevent the wheel from skidding or sliding sidewise by providing a series of spring-controlled dogs or claws which may be depressed to engage the ground surface, an adjustable wheel being provided to depress the dogs to a position beyond the circumference of the tire at the under side of the wheel as the latter rotates.

Bell Rings When Tire is Deflated

Hermann Jacoby, of Eberstadt, near Darmstadt, Germany, in a patent, No. 1,062,567, shows in connection with a pneumatic tire, a bell and a spring actuated sounder, therefor, normally clear of the bell, and having a portion projecting relatively near to the ground surface and alongside the tire, so that any unusual deflation of the tire will cause the said part to strike the ground and result in a sounding of the bell.

Lamps that Shift Automatically

In a patent, No. 1,063,952, Charles C. Bruff of Coalport, England, mounts the head lamps of automobiles with vertical reflectors which can be rotated in front of the lamps and are automatically and simultaneously rotated in accordance with the turning of the automobile so that the beam of light from each lamp is divided and an area is illuminated which extends both directly in front of the vehicle and in the direction in which the vehicle is being turned.

Boston Car Club Reunion

With an attendance of 70, the largest in its history, the Electric Motor Car Club of Boston September 11 ushered in the fall season at the Edison building. The club had lunch as the guests of General Superintendent W. H. Atkins of the Boston Edison Company.

Eight new members were elected, bringing the membership up to 124. The membership committee reported the offer of a cup by Business Secretary O. G. Draper, to be awarded to the member securing the greatest number of members before January 1. The committee also recommended that a special meeting be held for owners of electric vehicles. The publicity committee reported the contemplated advertising schedule for the next four months, and expressed its appreciation of the support given the club work by the Boston newspapers. "The magazine advertising of the Electric Vehicle Association of America and its member companies cannot reach its full value without being linked up to local newspaper advertising," said Chairman Albert Weatherby in making the report.

D. C. Tiffany for the committee on baseball league recommended the establishment of a four-team league for the competition for the loving cup presented by Mr. Atkins.

E. S. Mansfield, vice-president of the club, urged the members to attend the next week's convention of the New England section, National Electric Light Association at Burlington, Vermont, where a paper on the value of the electric vehicle to electric light companies was to be read. President Day Baker announced that the Algonquin Club of Burlington was arranging for a meeting of Burlington business men where the electric vehicle would be discussed on one of the convention evenings.

President Baker appointed the following nominating committee to nominate officers for next year: Col. E. W. M. Bailey, Albert Weatherby, L. D. Gibbs, Frank J. Stone and F. D. Stidham.

S. G. Thompson of the public service corporation of New Jersey, who is chairman of the papers committee of the Electric Vehicle Association of America, outlined the plans for the national convention and spoke entertainingly of the increase in electric trucks in New Jersey. "Two years ago," said Mr. Thompson, "there were 30 electric trucks in New Jersey. Now there are 304, an increase of more than 1000 per cent. There are now 206 passenger vehicles in the state. We estimate that within a few years there will be at least 4000 electric trucks in New Jersey."

Business Secretary O. G. Draper reported that there are at present 951 electrics in Massachusetts out of 1539 in New England.

Associations Take Orphans for Joy Rides

Five automobile associations in the city of Chicago last month pledged the orphans of the city at least one day of happiness every year.

To centralize their efforts for a successful bestowal of charity and philanthropy an association was formed, articles for the incorporation of which now are before the secretary of state for consideration. The organizations party to the movement are the Chicago Automobile Club, Chicago Motor Club, Chicago Garage Owners' Association, Chicago Automobile Trade Association, and the Electric Vehicle Association of America.

Electric Trucks Gaining in New York

The vogue of electric trucks in New York is becoming so widespread that the producers of this class of machines foresee the time when they will outnumber the gasoline type. During the first seven months of the current year 271 new electrics were placed in operation, bringing the total number to 2,151, or about 40 per cent of all the commercially used cars in greater New York. The prediction is made that the last five months of 1913 will bring the installation of at least as many as the first seven.

The varied uses of the electric are shown by the fact that they are employed in seventy-six lines of business. Three hundred and twenty-two are in the service of brewers, 262 makes deliveries for department stores, 197 serve the express companies, 154 deliver bread and 127 serve the central stations.

Private Electric-Car Livery Service

Due to recent financial reverses, a certain lady living at an eastern summer resort was threatened with the loss of her electric automobile. Rather than sacrifice the car at a small price she determined to convert it into a revenue producer. After a little mental financering she determined to hire her electric out to the public. First she had tasteful little folders printed announcing that her car was for hire for shopping trips, etc., and these she distributed to the local hotels.

"My private electric car is at your service," reads the announcement, "for a morning's shopping to the exclusive shops; for a ride out of town; for church-going; for an outing for convalescents; for trips to the theater; for luncheons, etc."

The folder continues with a little description of the electric as safe, quiet, clean, comfortable, conservative, luxurious and commodious, in fact ideal for the elite and refined.

At a rate of $3.50 per hour, with a slightly lower price per hour if hired by the day or half-day, finances were strengthened until this same person has at the present time the exclusive enjoyment of the luxury afforded by her electric.

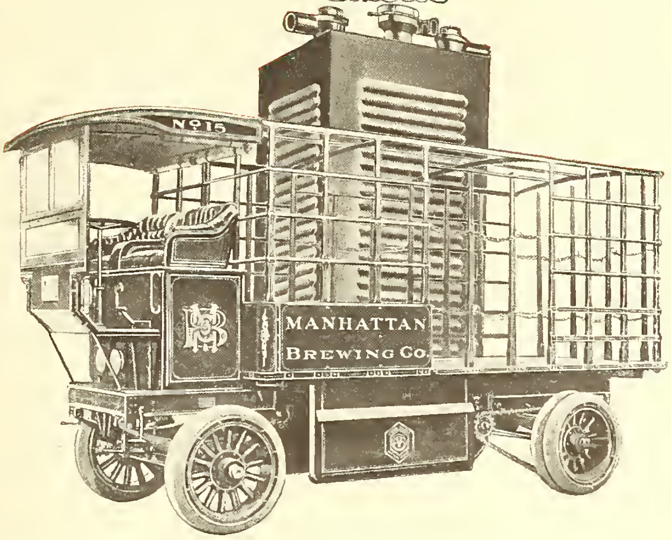
That Cosmopolitan Bailey Car

In the August issue of Electric Vehicles there appeared an article relative to the Bailey truck as used in the service of the Cosmopolitan Electric Company. The author of this article stated that the original battery had been replaced by a smaller one capable of covering from 15 to 26 miles, sufficient for the purposes of the vehicle. We are informed, however, that this is an error, and the battery used is regular equipment, with a capacity for 60 to 80 miles or more.

Electric Covers 500 Miles

Mrs. Pillsbury Boyd, the manager of the Steinhart apartments, of San Francisco, the magnificent structure on Sutter street, near Leavenworth, the home of a number of our leading citizens and their families, does not appear to be burdened with the cares incident to the successful manager of so extensive an establishment. Mrs. Boyd finds time for travel and fully enjoys touring in her splendid Detroit electric car through California. She has driven her car through Southern California, covering a distance of 500 miles, taking in the wonders and attractions for which California is world-famous.

Edison



"Equipped With Edison"

This 5 ton truck made three trips from the Brewery to South Chicago on Monday, August 4, 1913.

Total distance traveled, 64.3 miles.
Left in battery at end of day, 7 miles.
Boost at noon, 30 minutes.

Loads:
Trip No. 1. 33 bbls., 2 half bbls. of beer —approximately 6½ tons.
Trip No. 2. 29 bbls., 8 half bbls.
Trip No. 3. 33 bbls.
An even hundred barrels delivered.
20 tons on a 20 mile route.

The Manhattan Brewing Company of Chicago owns this 5-ton G. V. Truck. It is one of an order of five.

The Edison Storage Batteries are guaranteed to be capable of developing their full rated capacity at the end of four years.

EDISON STORAGE BATTERY COMPANY

105 Lakeside Avenue **ORANGE, NEW JERSEY**

Send for Bulletins on the Edison Alternating Current Rectifier for Charging Ignition and Lighting Batteries

---

ANNOUNCEMENT

¶ The now famous BAILEY ROADSTER, equipped with Edison Battery, will be seen in Chicago at the end of October.

¶ This car has made a wonderful record for speed and mileage and its appearance will be eagerly looked forward to by all who appreciate the great advantages of the electric automobile.

¶ A list of some of the runs made by this car on one charge of battery is herewith given. The high average speed maintained is particularly interesting, as it compares favorably with the speed of gasoline cars.

Road Runs by Bailey Electric Roadsters

Boston to Pawtucket and Return—
103.2 miles in 5 hrs., 7½ minutes.
Av. speed, 20.14 miles per hour.

Boston to Springfield—
93.4 miles in 4 hrs., 55 minutes.
Average speed, 19 miles per hour

Boston to Wareham—
58 miles in 2 hours, 7 minutes.
Av. speed, 20.08 miles per hour.

Worcester to Boston—
42.6 miles in 2 hours, 1 minute.
Av. speed, 21.1 miles per hour.

Boston to Lowell—
25.9 miles in 1 hour, 12 minutes.
Av. speed, 21.6 miles per hour.

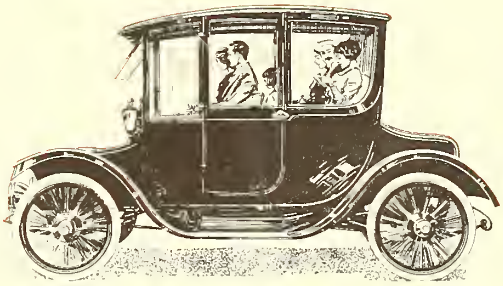
Brockton to Boston—
21.8 miles in 1 hour, 5 minutes.
Av. speed, 20.2 miles per hour.

Hartford to Springfield—
26.9 miles in 1 hour, 17 minutes.
Average speed, 21 miles per hour.

S. R. Bailey & Company, Inc.

895 Boylston Street, Boston, Mass.

W. J. McDowell, Wilmette, Illinois
Chicago Representative



Five Passenger Coupe

The Borland Electric

Either Front or Rear Drive

THE car with the clean-cut thoroughbred air; combining the essential *dash* with *solid* dependability of design and construction. Comfortable; roomy; five luxurious, forward-facing seats; beautifully appointed.

A car you will be proud to own. Regular equipment includes "Exide" batteries; standard makes of cushion or special pneumatic electric tires. Price $2900.

The Borland Electric Roadster—a rakish, good-looking, serviceable man's car—many women like it too; open body and wheel steer, $2550.

Send for the Borland Poster Book

The Borland - Grannis Company

Chicago Salesrooms: 2634 S. Michigan Ave.

Factory: 310 E. Huron Street, Chicago

EMC
ESTABLISHED 1907
PUBLISHER
TECHNICAL MAGAZINES
AND TECHNICAL BOOKS

ELECTRIC VEHICLES

Vol. 3 CHICAGO, OCTOBER, 1913 No. 10

WOODS MODEL COUPE CAR

ANNOUNCEMENT

¶ Electric Vehicle Maintenance, with Battery Renewals. The William Knobloch Company, electric vehicle maintenance contractors, has added a South Side Service Station to its equipment for the entire upkeep of Storage Battery Vehicles at greatly reduced costs, and at this South Side Station pleasure cars only will be cared for. Commercial cars only will be served henceforth at the company's West side station, 950 West Randolph Street.

The New South Side Station is located at

4137 COTTAGE GROVE AVENUE

and has a capacity for over 1000 cars on maintenance

¶ If you own an electric vehicle, find out about this Knobloch Service. It enables you to know in advance exactly what the upkeep cost for your car—both for the battery and all mechanical parts—is to be. You reduce it all, in this service, to a small monthly fee.

¶ The service automatically, as you can see, eliminates all that illegitimate repairing and check-making tinkering, as, under this maintenance service, the more satisfactorily your car is in operation for you the more profitable our business is.

¶ **Compare that proposition**—A postal card or a phone call, Monroe 5387, will bring a representative with full details of a money-saving and satisfaction-giving electric vehicle maintenance service.

William Knobloch Company

West Side Station—950 W. Randolph St.
(Commercial Cars Only)

South Side Station—4137 Cottage Grove Ave.
(Pleasure Cars Only)

Comfort Predominates

MORE than the comfort of easy-riding, soft-cushioning, luxurious appointments—although, these are important. The Borland Electric goes farther than this—offers you *individuality* of comfort—from the sashless, clear-view windows to the exclusively Borland Electric arrangement of the foot brake levers, which eliminates the floor opening where cold draughts enter in most electrics.

Five Passenger Coupe $2,900

The Borland Electric

Either Forward or Rear Seat Drive

Extra roomy 5-passenger coupe body; left side drive from either front or rear seat; six speeds forward and three reverse. Regular equipment; "EXIDE" batteries; standard makes of cushion or special pneumatic electric tires. Price, $2,900.

Send for the Borland Electric Poster Book

The Borland - Grannis Company

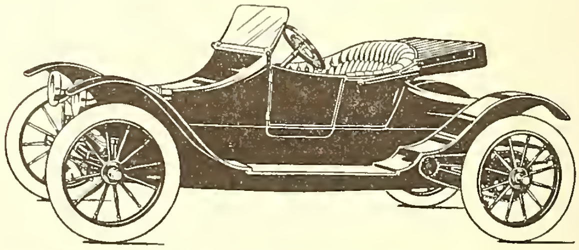
Chicago Retail Salesrooms
2634 South Michigan Avenue

Executive Offices and Factory
310 East Huron St. Chicago, Ill.

BAILEY Electric

Superior to Any Gasolene Car
In Convenience of Operation, Durability, Reliability and Comfort

Superior to Any Other Electric Car
In Speed and Mileage



Bailey Electric Roadster

WITH EDISON'S WONDERFUL BATTERY

AT LAST

An Electric Which Can Keep Up with the Gas Cars,

BUT

- No gears to shift
- No clutch to throw in
- No engine, carburetor, or ignition troubles
- Always starts
- No cranking
- Cannot freeze
- Free from vibration and smell

S. R. BAILEY & CO., Inc.
895 BOYLSTON STREET, BOSTON
Factory at Amesbury, Mass.

Published Monthly By
ELECTRICITY MAGAZINE CORPORATION
Monadnock Building
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Volume III CHICAGO, OCTOBER, 1913 Number 10

All Ready for the Big Convention

Preparations Completed for the Annual Event at Chicago

BY W. J. McDOWELL

CHICAGO has been selected as the host for the fourth annual convention of the Electric Vehicle Association of America. The Chicago section has practically completed arrangements to entertain the visiting delegates.

A special train over the Lake Shore and Michigan Southern railroad carrying delegates from New York, Boston and other eastern points will arrive in Chicago Sunday night, October 26. Many of the Chicago members will be waiting at the depot to welcome the visitors.

Definite plans and preparations are completed and it is expected that the program will be one of the best ever presented before a convention of the society.

Registration will take place Monday morning, October 27, in the lobby on the nineteenth floor of the Hotel La Salle.

At ten o'clock on Monday, the first session will convene in the Red Room located at the north end of the same floor. For luncheon on Monday, the delegates will probably be entertained by their friends. At two o'clock the second session will convene in the Red Room after which a beefsteak dinner will be served at six o'clock in the grand ball room, located in the south end of the nineteenth floor.

Convention Program of the Electric Vehicle Association of America

Monday, October 27
MORNING SESSION
President's Address
Arthur Williams
Secretary's Report
Treasurer's Report
Report of Committees
Report of Committee on Rates and Charging Stations
John F. Gilchrist, Chairman
Appointment of Nominating Committee

AFTERNOON SESSION
"What the Sections are Doing"
Chicago Section .... Homer E. Niesz
New England Section .... J. A. Hunnewell
New York Electric Vehicle Association .... Harvey Robinson
Electric Motor Car Club of Boston .... Day Baker
"Traffic Problems and the Automobile"
Dr. E. E. Pratt, Manager Industrial Bureau, Merchants' Association of New York
"The Merchant, the Central Station and the Electric Truck"
F. Nelson Carle
"Co-Operation Between the Electric Vehicle Manufacturer and the Central Station"
A. L. Callahan

Tuesday, October 28
MORNING SESSION
Report of Nominating Committee
"Charging of Storage Batteries in Unattended Garages"
Maxwell Berry
"Electric Vehicle Salesmanship"
George H. Kelly and E. J. Bartlett
"The Electric Vehicle in Department Store Service"
C. A. Duerr and David F. Tobias
"Recent Developments in the Lead Battery for Electric Vehicles"
Bruce Ford
Election of Officers

AFTERNOON SESSION
"Electric Commercial Vehicle Tires"
F. E. Whitney
Report of the Publicity and Advertising Committee
Frank W. Smith
"How to Make the Business Healthy"
A Talk by Ralph Temple

Following the dinner, the committee has arranged an automobile trip which will leave the convention headquarters at 8:00 o'clock. The purpose of the excursion is to give the visiting contingent an opportunity to inspect the South Side electric garages, especially the Fashion Automobile Station, which is claimed to be the largest and most modern electric garage in existence.

After a visit to the garages, the automobile party will return to the hotel where a spicy, gingery cabaret and smoker will leave many a happy reminiscence in the memories of those present. It is stated that the choicest of viands and cigars bearing the label of the association will grace the occasion.

Tuesday morning at ten o'clock, the third session will take place in the Grand Ball room. At twelve-thirty, the Commonwealth Edison Company will serve a luncheon in the main dining room on the ground floor. Tickets will be required and can be obtained by all delegates and their friends

George Harvey Jones,
Executive Committee.

Arthur Williams,
President, E. V. A.

William J. McDowell,
Secretary-Treasurer, Chicago Section.

Day Baker,
President New England Section.

Frank W. Smith,
Chairman, Sub-Committee.

Uri B. Grannis,
Executive Committee.

D. C. Arlington,
Philadelphia Storage Battery Company.

Edwin E. Witherby,
General Vehicles Company.

Ernest Lunn,
Walker Vehicle Company.

Carl Metzger,
Metzger-Harrington Company.

Homer E. Niesz,
Chairman, Chicago Section.

J. S. Codman,
S. R. Bailey Company.

upon request from the secretary or at the registration bureau.

The final session at two o'clock on Tuesday afternoon will probably be devoted in great part to the election of officers. In order to provide representation for the sections among the directors of the association, an amendment has been proposed to the constitution, providing for three vice-presidents instead of one. The amendment is to Section 1, Article 5, and reads as follows:

> The officers of the Association shall be a president, three vice-presidents, a secretary and a treasurer. The officers of the secretary and treasurer may be filled by one person. The officers shall be elected from the members in good standing at the annual meeting to be held on the second Tuesday of October in each year. Election shall be by ballot.

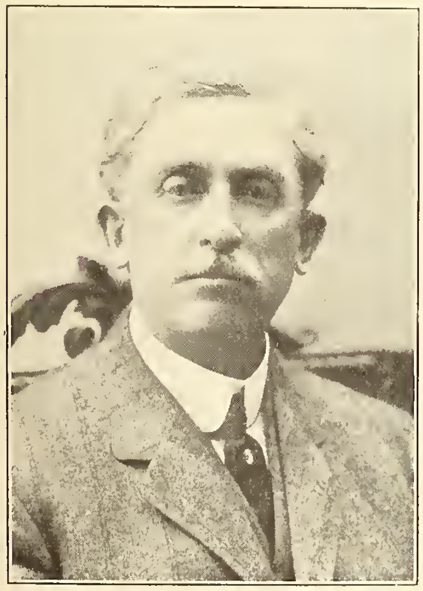
Badges will be given to all those who register, a blue badge designating an officer of the association; a red badge for the members, and a white badge for guests.

Association buttons will be on sale and it is expected that every member of the organization will wear the representation at this event.

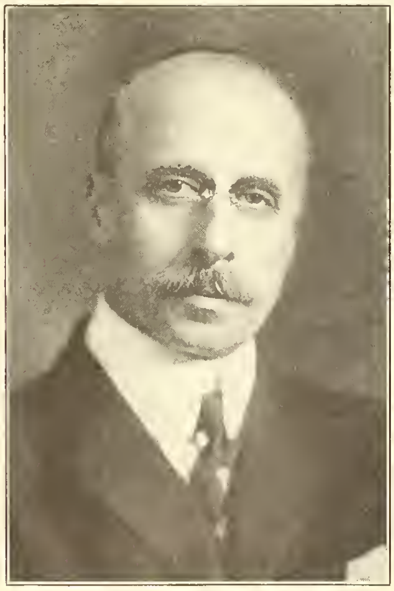
Like every other regular convention, space will be reserved for the exhibition of the manufacturers' products. Electric vehicles and accessories will be exhibited on the eighteenth floor and guests and members will find this a grand opportunity to become acquainted with the good qualities of the product on display.

Reports of the various committees on transportation and arrangements are predictive of a large attendance of enthusiastic "boosters" of the industry.

Those firms who will exhibit are the General Vehicle Company, the Walker Vehicle Company, the Baker, the Chicago Electric, the Bailey, the Borland-Grannis, the Philadelphia Storage Battery Company, the Edison Storage Battery Company, the Electric Storage Battery Company, the General Electric Company and the Electric Products Company.



Fred M. Kimball,
General Electric Company.



Frank J. Stone,
Electric Storoge Battery Company.

E. J. Kilbourne,
General Motors Company.

Electrics Entered in Cleveland Perry Centennial Parade.

Cleveland Has Perry Day

The most spectacular feature of the Perry Centennial Celebration just concluded in Cleveland was the 15-mile parade in which over 1,000 automobiles participated. At the head of the automobile section, a singularly interesting exhibit showed the chronological development of the Baker electric automobile.

Leading the line was the first Baker electric built, carrying a sign showing the date of manufacture, 1899. Driving the car was the oldest Baker electric employe costumed as "Father Time." Following in order were the succeeding models of the Baker Company, each car marked with the date of manufacture and showing the year's advance in the development of the modern car. At the rear of the line were the three models, roadster, coupe and brougham.

The big brougham, which was the last car in the Baker line-up, captured first prize for the best decorated electric in the parade. It was beautifully covered with gold and blue and hung with sprigs of orange blossoms. One hundred little electric light bulbs outlined the exterior of the car. Under the glow of the inside lights a beautifully gowned bridal party rode in the car. A ripple of applause followed this car all the way along the line of parade.

In addition to the first and third prizes for decoration, the Baker Company took first prize for having the largest number of cars under 110-inch wheel base in line.

Must Appeal to Women

"Until I entered the electric car business I never realized what a prominent factor women were in the selling of automobiles," says R. G. Kagey, local distributer for Rauch & Lang electrics at Kansas City, Mo. "In my experience I have had to consider the woman factor more or less but nothing compares to the prominence she takes when the purchase is an electric car. It may be a wife, daughter, mother, sister or sweetheart who becomes identified with the purchase of the car. Every electric is bought with the woman influence hovering around the sale. Her desire for ownership antedates her outward interest in an electric car a long time. Nearly every woman desires the ownership of an electric car just as one loves beautiful clothes and jewels.

"If the husband, father or brother who eventually must be appealed to in order to purchase the car, shows any interest in the purchase of an electric car it is more than likely that the woman will become the real salesman in the purchase of the car. She interests herself and if conditions warrant it is a foregone conclusion that she will assist very materially in the closing of the sale.

"Every man's desire is to make the woman dependent upon him, happy. If it is within his power to purchase a motor car and the woman evinces any interest in a particular type of car it is almost a certainty unless something unusual happens, that that type of car will be the one which will be purchased.

"Women love beautiful things and naturally grow fond of an electric car because it is their ideal type of conveyance. If we can convince the women we are quite positive that they will act in the capacity of salesman for us in a manner that would be quite impossible for us to duplicate.

"When the women ask consideration for a certain type of car the men folks of the family must listen and listen in a thoroughly different manner from what they do when the salesman presents his various arguments for the purchase of his car. Women are such enthusiasts that they can paint the things in which they are interested much more beautifully and wonderfully than can the salesman.

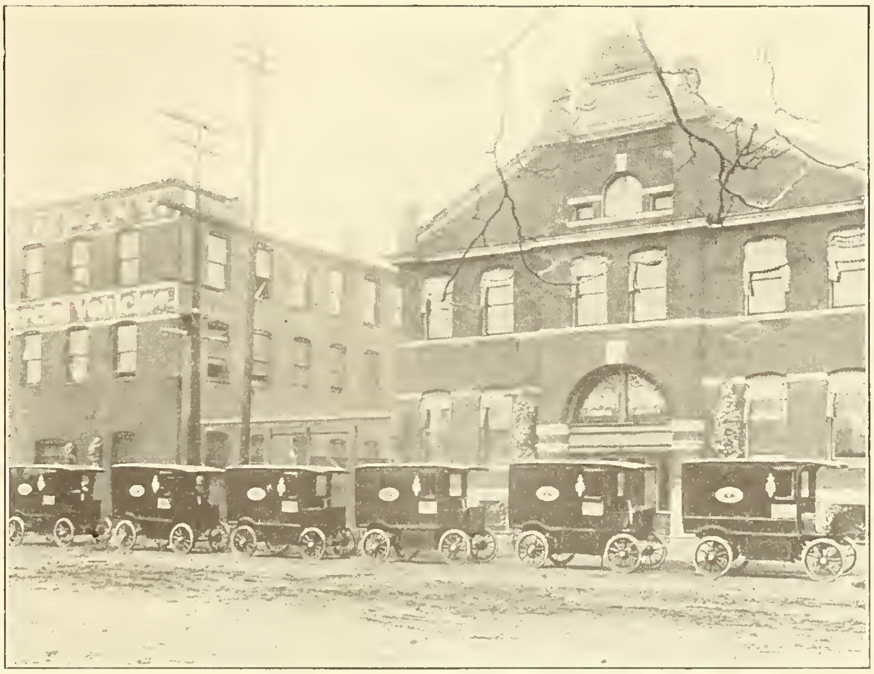
"Because of the strong woman influence that is brought to bear on each sale of an electric car, the manufacturers of that type of vehicle must give heed to the dictates of the feminine sex in the building of their cars.

Value of Electric Vehicles to Central Stations

Paper Read Before the New England Section, National Electric Light Association

BY W. H. SNOW & DAVID W. BEAMAN

THE electric vehicle industry has already begun to assume such proportions, from the standpoint of both the manufacturer and central station, that it demands the special attention of these interests to insure its further development. The electric vehicle manufacturer is naturally the one most interested in the immediate adoption of this means of transportation, as its business prosperity depends entirely upon the successful marketing of its single class of product, whereas, the central station is not dependent on any one form of energy consuming device for its income. This partially accounts for the fact that the electric vehicle has been completely ignored by the central station as a whole, up to a comparatively short time ago, and by a majority of these at the present time. Considering, however, the particularly profitable character of business offered by the electric vehicle, it becomes the duty of the central station to realize its responsibility and enter actively into the promotion of this most attractive branch of its service. It will, therefore, become the function of this paper to present to the attention of central station men the electric motor car in its true light so that the electric supply companies will adopt it with enthusiasm and recommend it to their customers for their own use. In defense of the central station and its former negative attitude, it must be admitted that the earlier types of vehicles and batteries were not of a character to warrant enthusiastic co-operation, but remarkable developments have taken place along these lines during the last few years, and it is our purpose to prove by actual cases and personal testimonials of users, that the electric of today is no longer an experiment, but that it is filling a long-felt need and is worthy of the intelligent consideration of the electrical fraternity. The central station, which has not made a study of the problem, naturally asks the question, "Of what value is the electric vehicle to us?" and to such an inquiry we answer actual experience shows it. The passenger electric is operated intermittently during the day, and to some extent during the evening, while the commercial wagon is used during the working hours of each day, consequently, recharging of the batteries naturally takes place during the night after the power load has been discontinued and the lighting curve has begun to flatten out. This means that generating apparatus and transmission copper can be made to return dividends at times when otherwise they would remain idle, and the only expense necessary is that required for extra service. Thus the electric vehicle provides a greater per cent of income with a comparatively negligible expense. A passenger electric will average to use from one hundred to two hundred kilowatt hours per month, and a one-ton commercial vehicle of an average equivalent will consume approximately four hundred kilowatt hours per month. Multiply these figures by the number of electrics you might reasonably expect to be operated in your territory, then figure out your annual income at the rate per kilowatt hour you could afford to make for this character of business. Compare this amount with the income received from other sources at the same expenditure of time and money and you will be convinced how you can best serve your stockholders. For years, the central station spent most of its time developing its lighting load to the exclusion of all other forms; then its attention was turned to introducing electric power, and finally, during the last few years a great deal of effort has been exerted stimulating the use of electric signs and electric cooking and heating apparatus.



Six Waverley Electric Service Wagons for Use by the New York Edison Company.

All of these current consuming devices are used during a comparatively small number of hours during the day and early evening, while throughout the remaining hours of the twenty-four, a large per cent of the investment remains unproductive. Mazda lamps are increasing in efficiency, the power load has become fairly well established, while the miscellaneous apparatus above referred to consumes power in comparatively small amounts at a net profit less than is enjoyed in other branches of the business.

At this crisis in the industry when the electric supply company is looking about for some means of increasing its output, the modern electric vehicle offers itself as a solution to the central station problem. It is easy to figure the amount of income received from the charging of an electric as compared with that received from other classes of apparatus connected to the system, and in the light of this comparison one should be convinced how much more he can afford to expend in promoting this department than would be justified in less remunerative ways. It is interesting to note the extent to which electric vehicles are being used in various sections of the country and the rate at which they have increased during the last year. The following figures, which must be considered as approximate, as they are being changed from time to time, will show the number of machines in use in some of the larger cities in New England, and also those used throughout the country, together with the per cent increase where it can be determined:

	Passenger	Commercial	Increase
Pawtucket, Rhode Island	5	7	50%
New Bedford, Mass	14	11	100%
Springfield, Mass.	25	50	100%
Hartford, Conn.	250	45	75%
Lowell, Mass.	7	15	12%
Worcester, Mass.	34	....	100%
Providence, R. I	28	30	43%
Greater Boston	282	261	42%
Salem, Mass.	19	3	33⅓%
			Total
New York City	498	1,700	2,198
Chicago	2,200	630	2,830
Washington, D. C	654	255	909
Denver, Colo.	850	37	887

In the last few cities it is impossible to tell what per cent of these totals have increased during the last year, although we have every reason to believe that it is a considerable per cent. In the New England States the following number of registrations were recorded up to the last of August:

	Passenger	Commercial	Total
Maine	8	4	12
New Hampshire	28	16	44
Vermont	6	3	9
Massachusetts	562	385	947
Rhode Island	28	42	70
Connecticut	335	133	468

This makes the total in all New England of 967 passenger and 583 commercial, a total of 1,550, so by referring to the above figures, it will be noted that there are more vehicles in each of the cities, New York and Chicago, than there are in the whole of New England. In order that it may be understood a little more clearly how electrics are received by their owners and users, we are abstracting from certain letters which have been received by the Electric Vehicle Association of America and by various agents both in New England and elsewhere. In cases where the name of the car was used this has been omitted and also any further information which does not deal directly with the subject in hand, as we are endeavoring to treat the matter broadly and are discussing electrics in general, rather than any particular makes or types.

A manufacturing company in one of the mill towns of northern Massachusetts writes as follows:

> We have had two electric trucks in use for upwards of two years, and while we have had to make repairs more or less, in the main, they have given good satisfaction. We find they handle the work much better and quicker than horses possibly could, which allows us to take care of a great volume of work, which we could not possibly do under our old system of horses.

Another manufacturer in Pawtucket, Rhode Island, writes as follows:

> We have had two electric 2-ton trucks in service for some time, one coming into service in July, 1912, and the other in April, of this year. We have found them dependable at all times, and the maintenance charges are very low. Number one was taken out of service for three days after running 5,200 miles and new bushings were put in steering post, two segments replaced in the controller and the battery solution renewed.
>
> The total maintenance charges on this machine did not exceed $100 up to the present time, including tires. The second machine has not yet needed repairs. We charge nights and boost at noon and average about twenty miles a day for each truck. Before buying trucks we had six horses and now our stable is for sale, lease or to let, for we have a new garage across the street. We have also two electric passenger cars in service. We have found that electric vehicles fill the bill in fine shape for us and we will help "boost" the electric.

An electric light company writes as follows:

> Our electric machine is used in the day time by the construction foreman, who averages close to 700 miles in a month, and at night by our night patrolman, who at this season of the year averages very close to 1,000 miles a month. It is put on charge at about eleven o'clock every night and left on until full; it is taken out by the construction foreman at 8:30 in the morning and run until noon, when it is put on again for about an hour, then at five o'clock it is put on charge until about 7:30 p. m., when the night patrolman takes it out.
>
> We have been giving this car a lot of work to do, to see how it would stand up under unusual conditions, and so far we have been very much pleased with its performance. We hope to be able to purchase another some time next year for the use of our construction foreman only, so that the present car can be kept for the use of the night patrolman.

We quote from a teaming concern in Hartford, Connecticut, which writes as follows:

> We have used a one-ton electric commercial car since June 10, 1912, and up to June 10, 1913, one year; it had run 10,501 miles and earned $2,650.17. We used this car in connection with about fifty horses in a general teaming business using this for the long, hard runs with a view to saving the horses rather than showing large returns. In all large teaming businesses, there is an ever-increasing number of long and longer deliveries which go in with the short distance deliveries and all pay the same price for delivery, so by taking out these long runs which are done at a loss, and giving the horses short runs, which pay well, it is rather unfair to the power wagon, but with this handicap it has earned us 30 per cent profit above all known or estimated expense, including depreciation, average up-keep, insurance, liability, interest, taxes, tires, etc., etc. Before we had this power wagon we used three horses to two wagons, one horse resting. Since we have had this power wagon the third horse is working, as the horses do not get the long runs and are in better condition than before we had the "horse saver." Now you ask me what I think of it. What would any business man think of an advance that would pay him 30 per cent net, and would pay that on work that was done at a loss with the horses?
>
> How do they compare with gasoline trucks? They are simpler to handle and there is no engine to wear out. Strong advocates of gasoline trucks are replacing them with electrics for local deliveries of fifteen miles or under from home. We feel confident that in a short time battery stations will be located in all the principal cities and an electric car can go anywhere its owner cares to send it by exchanging batteries at any station. It is perfectly feasible and is coming.

A large meat packing establishment in Chicago, Illinois, writes:

> A 3½-ton electric truck went into commission on November 30, 1910, and had covered 9,421 miles up to November 30, 1911. During this period the truck has been in service every working day making deliveries of meat to downtown points in Chicago, and to such suburban points as Oak Park, Kensington and Dunning. The average load carried has approximated the rated capacity of the truck. During the very hot weather this truck was performing the work of three teams, covering anywhere from 45 to 55 miles per day. The driver states that he had no difficulty at all in making 45 miles and picks out the following figures, namely, 49, 50.1, 52.4, 55 and 59 respectively as proved.

One expense which they were put to during this interval was the renewal of tires, and the replacing of the Morse chains after approximately 7,000 miles of service. A hat manufacturer in Philadelphia, Pennsylvania, writes as follows:

> We beg to say that not only has our electric truck given us good satisfaction, but we do find that in the five years that

we have had it, it has been subjected to very severe tests, all of which it has stood exceedingly well, and while, of course, there have been minor repairs made from time to time, these have been very small in amount and it gives us great pleasure indeed to recommend the electric truck to the use of the public.

A large electric manufacturer in New York writes as follows:

We desire to express our complete satisfaction with the 2-ton electric truck which we purchased about a year ago and which is showing a remarkable saving in our cost of transportation. We have at hand a memoranda of the last 280 days of operation, which shows the following:

Truck carries	1,483,375	pounds
Average pounds per day.......	5,297 3-4	pounds
Distance traveled	8,605	miles
Average miles per day...........	30 6-7	miles

Our trucking system shows that this was done at a cost of $833.08 less than we are able to do with our horse-drawn equipment, which is a remarkable demonstration of the "economical and working capacity of the electric vehicle." We might add that this truck has more than met our expectation in points of economy and reliability.

Thomas A. Edison and His Wife in Their Electric. Photo by the American Press Association.

The following was received from a hardware manufacturing company of Pittsburgh, Pennsylvania:

We still have in daily use the 5-ton electric truck bought seven years ago, and it is giving us the same satisfaction it has given us during its entire service. While the truck has had what we consider a long life, it is today in excellent condition and seems good for many years to come.

A trust company in Cleveland, Ohio, writes as follows:

It would seem that there is nothing better we can say than to recall the fact that we purchased our second machine after some six or seven years' experience with the old truck.

The following was written by the president of a machine company in Boston, Mass.:

We will turn the letter of inquiry over to our general management department for attention as I know nothing about the details you call for except that our vehicle seems to be still running about the streets at all hours and times and in all kinds of weather, much to my surprise..

A furniture company in Kansas City, Missouri, writes as follows:

We take pleasure in sending you herewith our order for another 2-ton electric truck to be delivered as soon as possible. Our electric vehicle equipment is steadily increasing, this being the third machine we have purchased. We find electric delivery service efficient and economical and expect to do away with our entire horse equipment in the near future.

The following from a railroad transportation company in New York:

Regarding the experience which we have had with the electric which was built for us nine years ago, would say that it has been very satisfactory and there has been no time that we would have changed back to the horse vehicle, for economical or any other reasons. Of course, at that time the art of building cars and batteries was not so well understood as now, and there are some things about our old car which we would like to have a little different, but we are satisfied, barring little things which have since been corrected, and we have used the car every day for nine years. I hope to send an order very soon for one of the latest models.

A light and heavy teaming concern in Methuen, Mass., has sent the following letter:

In regard to our 3½-ton truck which we purchased six months ago, will say that it has proven satisfactory. The truck has drawn the greater part of our supply ice from ice houses to the delivery wagons, which is a round trip of five miles. The truck has also drawn the greater part of our ice from the houses to the yard for the loading of the teams and for the start the next morning. One man has been employed to load and operate the same, the machine being the most simple thing to operate. In years past, we have had two 2-horse teams to draw our supply ice to the delivery carts, our teams being obliged to go to the ice houses for their ice for the next day, a distance of two miles, and return making another distance of two miles, loaded. So far as the actual difference in figures is concerned, we are not able to state as we have not figured them, but can easily say the truck has a great advantage over horses and we recommend them for use.

A dealer in meats and lard in Cedar writes as follows:

We beg to state that the entire cost in connection with the 3½-ton electric truck purchased by us over sixteen months ago, for the last year of that time was $3,353.84. This covers insurance, repairs, new tires, new batteries, and wages. I might add for your information, that in putting this truck in service, we put out of service two double wagons, the cost of which for the same period, would have been $4,694.60, or a saving in favor of the truck of $1,340.76.

A dealer in meats and lard in Cedar Rapids, Iowa, furnishes the following:

We are very glad to be able to advise you that during the eighteen months in which we have had in operation two electric trucks, a one-ton and a five-ton vehicle, we have been entirely satisfied with the results which we have obtained from their use. Outside of renewals of various batteries and parts, we have had no expense whatever in connection with these trucks.

The conditions under which we have been operating these trucks are peculiar to our own business and on this account we do not believe that the figures showing cost of maintenance and operation, would be of any service to you. We are, therefore, not sending these figures.

A baking concern in New York City, in ordering a new 1,000-pound car, writes as follows:

Please deliver as soon as possible our new 1,000 pound car as we are tearing down our stable and need it very badly. It is now a year since we first started using electrics and they have proved so satisfactory that we are doing all our delivering with them. By the way, it was the splendid performance of the first 750 pound electric wagon we bought, which convinced us of the value of the electric. Our total operating cost for this wagon for the first twelve months was only $164.91. Now, as you know, we will soon have no horses whatever, but all electrics in our delivery service.

A firm of commission merchants in Cincinnati, Ohio, writes as follows:

Eight years ago we purchased an electric truck which has been constantly in use in our business and is now doing excellent service. It is with great pleasure that we hand you this letter recommending the truck. We are sure that with the new and up-to-date improvements that have been instituted since this truck was made, intending purchasers will have even better service than we have had and are now getting from this one.

A railway and steamship line in New York City writes as follows:

We beg to say that the fact that we used for nine years one of the first cars made, and practically every day in each year, in all kinds of weather, then ordered another one, is the best evidence we can furnish that we are not only pleased with the vehicle, but with our treatment by the electric dealers. We could not, and would not go back to the horse vehicle under any circumstances. If the new cars are as good as we think they are, and as is claimed for them, we will be very pleased when we receive the new machine.

The central station in West Chester, Pennsylvania, writes:

Our vehicle has been with us a very short time, but we have had no trouble with it whatever. It has hauled some very heavy loads, and find it able to climb the worst hills in our vicinity. Thus far we have nothing but praise for the machine.

The New Woods Roadster, "Head On."

The central station in Hartford, Connecticut, states that the Hartford Electric Light Company has been using electric vehicles for more than twelve years and getting satisfactory results in all this time. In fact, some of the original vehicles are still in service. The up-keep of the electrics were found by actual trials of other types to be far the least and the service more reliable. The company takes pleasure in saying that the cars are in frequent use and giving better results than they were led to expect. There have also been received a number of testimonial letters from various central stations throughout the country, but we are assuming that statements from the users, not interested in the industry means more than those from the people who are receiving a benefit from their sale.

A dealer in millinery in New York writes:

We are very pleased to inform you that the service rendered by the various electric vehicles we have purchasd has been very satisfactory, and the expense of batteries has been very nominal. Should we at any time increase the number of our vehicles, we have no doubt that they will be electrics.

A gentleman from San Francisco writes as follows, regarding the electric pleasure vehicle:

I take this opportunity of expressing my entire satisfaction with the workings, mileage and general behavior of the electric victoria which I purchased some time ago. Will state that the up-keep is surprisingly low for the mileage obtained in climbing the steep hills in and about San Francisco. For instance, one hill had a 24½ per cent grade which my electric climbed with ease. I have no hesitancy in recommending an electric car for anyone desiring a first-class vehicle.

A dealer in butter and eggs in Washington, D. C., writes as follows:

We are glad to say that the 1,500 pound delivery wagon which we purchased is giving even greater satisfaction than we anticipated. We find the speed and mileage to be in excess of the guaranty, and from what we have been able to learn we believe it is the most economical car for cost of charging current in the city.

Electric trucks seem specially adapted to the brewery trade, and we are quoting from a number of letters from brewers throughout the country. One from New York City writes:

It is with a genuine sense of satisfaction that we enclose you our check in payment of two electric trucks and charging equipment, the arrival of which at our brewery, at the beginning of the torrid wave when hundreds of horses were dropping in our streets from heat and prostration was almost providential. Moreover, the speed, promptitude and efficacy in our deliveries are such revelations that we have frequently chided ourselves because of our laxity in not utilizing them earlier, and unless our exuberance over these trucks thus expressed proves fallacious, we shall shortly dispense with horses as fast as time will permit.

Another from Cincinnati, Ohio:

We still have in daily use the two 5-ton electric trucks purchased in 1904. Besides these, we have one 3,000 pound wagon bought in 1905, two each of 2-ton capacity about the same age and a lighter wagon purchased in 1907. While we are confident that modern trucks and wagons must be more efficient and economical than those of the vintage we have, we wish to express our complete satisfaction.

Another from New York City:

We hereby place an additional order for six 5-ton beer trucks and twelve 3½-ton carrying capacity bottled beer trucks. This order is given on account of the splendid results obtained both as to service and economy over horse hauling, by the use of six 5-ton trucks built for us fifteen months ago.

One from Dubuque, Iowa:

We beg to say that eight years ago we installed a 1-ton double wagon and two 5-ton keg trucks which we are still using. The 1-ton truck has been practically in constant service since its installation, and the 5-ton trucks have been operated most of the time with the exception of some portions of the winter when we used our horses rather than let them stand idle in our stables. We have one trip which is made practically daily with the 1-ton truck, carrying a full load, which consists of a seven mile run and a climb of a 15 per cent grade, which is made without any trouble whatever. We start the larger truck on a 20 per cent grade with ease. Our cost of maintenance has not been excessive and we figure that we are doing the work at less expense than can be done with horses. We are charging off these cars at 8 per cent per annum, although we have no particular reason for using that figure as the cars have paid for themselves at this date. We believe that with ordinary care and attention the cars will last at least five years more, and aside from a slight difference in construction we consider them as good as new cars of the present type.

One from Newport, Kentucky:

We have had six 5-ton electric trucks in use during the last six or seven years. We operate them between our plant and railroad yards, about one mile distant. We have a splendid level road, in consequence of which our batteries are giving us excellent service, and our rubber tire trouble is small. In our case the trucks are doing excellent work in every way. These trucks have displaced at least thirty horses and probably twelve drivers, and as above stated, in our case the electric trucks are a great success.

One from La Crosse, Wisconsin:

Our 2-ton electric truck was put into service eight years ago and for the first five years we kept no record. We find, upon investigation, that our record on this machine from March 1, 1910, to October 2, 1912, shows an up-keep expense of $631.40. These figures cover tires, batteries and replacements as well as labor incident to making these repairs. During this period the truck has covered a distance of 11,840 miles. A 3½-ton truck furnished us in March, 1912, has covered a mileage of 2,360 miles at an expense of $45.00. The above figures do not include current. In our experience the electric truck has proved more satisfactory and economical than a gasoline truck for city deliveries.

A beer concern in Philadelphia, Pennsylvania, writes:

In regard to our experience with electric delivery vehicles, would say that we purchased the first one in November, 1903, since which time we have kept adding to our outfit until today we have twenty-three. Our early results from these trucks were rather discouraging on account of the high cost of up-keep occasioned by the necessity of frequent renewal of batteries and tires. This expense was our chief criticism against them as otherwise they were splendidly adapted to our line of business, giving us facility for rapid and frequent delivery. As improvements in batteries and tires rapidly developed, our up-keep expense decreased until today we rely very greatly on our trucks, to deliver our product, and only keep about half the number of horses we formerly did to help out when rushed. The average life of a battery of today is two to three times as long as those made seven years ago, and the same can be said of tires. Add to this the refinements introduced in the construction of electrics and improved motors and you have a logical explanation of why they are better for delivery purposes than horses. We are looking forward to the early delivery of the four trucks recently ordered in order that we can make further tests as to efficiency and economy of operation.

A machinery manufacturing concern in Plainfield, New Jersey, writes:

We beg to advise that we have not had our 5-ton electric truck in service long enough to make any statements further than that the truck is giving us excellent service, and we believe at a figure considerably less than a gasoline truck would do, particularly in getting in and out of close places. Our driver is getting so that he handles the truck traveling backwards almost as well as forward, and does both almost as easily and promptly as the average man would handle a wheelbarrow. We believe that the whole key to absolute success is having a proper knowledge of the care of batteries, and know just what to expect of it in the way of mileage, for all kinds of weather conditions.

A flour mill in Grand Rapids, Michigan, sends the following:

Five years ago we purchased a 5-ton electric vehicle which was a success from the start. Two years ago we were offered a second-hand 2-ton truck and we were so well pleased with the operation of the 5-ton that we purchased this 2-ton truck and we are pleased to state for your information that this second-hand truck has been more than we anticipated and hoped for. Both trucks are in daily use and show us a considerable saving in our cartage. Our expense and maintenance of the truck has been very low. We are contemplating at the present time the purchasing of a third truck to be delivered some time in the early spring.

A trucking concern in Detroit, Michigan, writes as follows:

It will probably interest you to know that the 5-ton electric truck which went into regular service covered a total of 2,525 miles in less than two months. The largest individual day's work was yesterday when the truck made a total of 60 miles and hauled fifty tons of coal, making five trips, with one battery, and five trips with another installed during the noon hour. This truck has not as yet been out of commission, and it has averaged about fifty miles per day for every working day in use.

A vermicelli factory in Brooklyn, New York, states as follows:

Your letter of November 29 was received by us in a very opportune time, because yesterday, December 6, 1910, we had a very severe snow storm, snowing and drifting all day long. Our electric truck made three trips carrying vermicelli, 6,000 pounds each time, two in Brooklyn and one in New York, and arrived back home with snow up to her hubs where it had drifted in, in the rear of our garage before six in the evening, and today it is out in the snow delivering all goods as usual. We do not consider ourselves capable of estimating how many horses or drivers it would take to do this work on a snowy day, but we must say we were more than pleased with our electric truck.

A furniture dealer in Kansas City, Missouri, writes:

We take pleasure in handing you herewith our order for another electric 2-ton truck, a duplicate of the one ordered by us last year. We are making from twenty-six to thirty miles a day over the hills of our city with the truck, replacing five horses. This order for a second machine is in consequence of the work done and our belief in the economy of the electric method of handling.

A shoe manufacturer of Boston, Massachusetts, writes as follows:

Our experience with a 3-ton electric truck has firmly convinced us of the economy of that means of transportation. With our factories producing over 15,000 pairs of shoes daily, service demand of the truck has been extremely hard, yet in every respect it has proved itself more capable than your claims had led us to expect. The best evidence of our satisfaction is the order which we have just placed for a 5-ton truck.

A cotton manufacturing company in Port Chester, New York, writes as follows:

We have operated a 5-ton electric truck for the past five years. The work required is the transportation of cases of cotton goods weighing 800 to 1,000 pounds each. We figure on carrying five tons to the load. During this period the truck has been in use every day except when being painted. We figure that it would require at least three teams of horses to do the work of the truck; on this basis we consider it much more economical. Regarding the battery cost, we have used one set of batteries for three years, assembling our own. We cannot make a stronger statement than to say that under no circumstances would we return to the use of horses for trucking purposes.

Three Borland Cars Recently Shipped to the Coast.

A novelty manufacturing company of Philadelphia, Pennsylvania, writes that it has used two electric trucks continually for three years and they are giving entire satisfaction. The company says it would under no circumstances go back to horses again.

The following is a list of the electric fleets now operating in New England:

Edison Electric Illuminating Co. of Boston	76
American Express Company of Boston	34
Ward Baking Company, Cambridge, Mass.	33
General Electric Company, Lynn, Mass.	25
Adams Express Company, Bridgeport, Conn.	21
National Express Company of Boston	13
W. W. Walker Company, Hartford, Conn.	12
New Bedford Gas & Edison Light Co., New Bedford, Mass.	10
United Electric Light Company, Springfield, Mass.	9
New Bedford Gas & Edison Light Co., New Bedford, Mass.	9

Friend Bros., Lowell, Mass.	8
Hartford Electric Light Co., Hartford, Conn.	8
J. E. Cousens Coal Co., Boston, Mass.	7
Metropolitan Coal Company, Boston, Mass.	7
Pacific Mills, Lawrence, Mass.	7
Pureoxia Company, Boston, Mass.	7
United Illuminating Co., New Haven, Conn.	7
Home Brewing Co., Bridgeport, Conn.	6
Worcester Electric Light Co., Worcester, Mass.	6
Boston Rubber Shoe Company, Malden, Mass.	5
Geo. W. Gale Lumber Co., Cambridge, Mass.	5
Houghton & Dutton Co., Boston, Mass.	5
Malden Electric Light Co., Malden, Mass.	5
Winchester Repeating Arms Co., New Haven, Conn.	5

Making a total of ....321 vehicles used by twenty-three firms.

Some of the largest installations of electrics in the country are as follows:

Adams Express Co.	250
American Express Co.	106
Coes & Martin Co.	100
Gimbel Bros.	96
New York Edison Co.	95
Ward-Corby Co.	64
Rochester Railway Lighting Co.	52
Ward Baking Co.	200
General Electric Co.	44
Edison Electric Illuminating Co. of Boston	76
George Ehret Co.	42
R. H. Macy & Co.	39
Commonwealth Edison Co.	29
Motor Delivery Co.	26
Peter Doelger Co.	62
H. C. Piercy Co.	43
Jacob Ruppert Co.	112
James A. Hearn & Son	35
Anheuser-Busch Co.	57

The United States government has also in use upward of seventy-five electric trucks. In the light of the above figures and personal testimonial letters, together with the amount of business which this means to the central station, it does not seem that it ought to be necessary to urge our various companies to exert a little energy in this direction.

In the foregoing we have quoted from the experiences of a large number of concerns, many of whom have had larger and more varied experience with the electric vehicle than has our company. Our experience corroborates the facts and figures given.

We purchased our first electric about four years ago for the use of our construction department. Before we had had it a week, a very heavy deep snow fell and with it the usual overhead line troubles came. Here was the opportunity to test the 1-ton electric. The test was entirely satisfactory, for the auto plowed the drifts and traveled many miles, taking care of the trouble calls in a way that would have been impossible with horses. Then in the past year came two runabouts and next three trucks followed in quick succession and are about three more trucks. These are all working every day and giving good service, accomplishing the work quicker and more satisfactorily than horses could do it. The accompanying table shows the record of these autos in the last six months:

Capacity	K.W.H.	Miles.	KWH per mile.	Miles per day.
No. 1, 2,000 lbs.	2,164	2,749	.79	18.3
No. 2, 1,000 lbs.	2,680	2,228	1.20	14.8
No. 3, 1,000 lbs.	2,280	3,480	.66	23.2
No. 4, 7,000 lbs.	3,600	1,876	1.98	12.5
No. 6, Runabout	1,842	4,775	.39	31.8
No. 7, 1,000 lbs.	1,850	3,747	.49	25.0
No. 8, Roadster	1,638	2,434	.67	16.2
No. 9, 1,000 lbs.	2,915	3,521	.83	23.5
No. 10, 4,000 lbs.	1,880	1,871	1.00	12.5

We are convinced by our own experience as well as by the experiences of others, as shown by the above testimonials, that the electric truck and electric runabout are of great value, not only to the central station but to the customer who uses them. To emphasize our conviction we might state that our company is building a garage in the center of the city adjoining our new office building, to try to encourage the use of electric vehicles by furnishing a place for storage where they can be charged and be taken care of in an intelligent manner. The garage is 65 feet by 100 feet and will house perhaps thirty electrics, including our own.

There seems to be no good reason why every central station should not put in use at least one electric and keep a data from this which it can use in urging its customers to adopt this economical transportation device. The future of the electric is very bright and the belief is growing stronger that when the electric vehicle is properly understood and scientifically applied, it will solve a great many of the transportation problems which are now worrying our merchants and manufacturers. The electric vehicle, as a current consuming device should be of great interest to members of the National Electric Light Association, and there should be nothing but harmony and cooperation between its members and representatives of the electric vehicle interests.

Science has entered the motor truck against the quadruped, and just as the electric light has supplanted candles, kerosene and gas, and the electric street car displaced the stage coach and horse car, so will the slow-going ox and expensive horse be superseded by that most useful invention of the twentieth century, the electric truck.

Ice Trucks in Porto Rico

The electric truck has not only proved satisfactory in its legitimate field, but moreover it has successfully invaded the practically undeveloped countries where conditions might seem fatal to its success. Not only has it established a prestige in its negotiation of handling deliveries of the average business, but moreover it has been installed in industries demanding a special mode of transportation for securing the best possible efficiency in rapid and uninterrupted service.

Porto Rico serves as an example of a field which has conditions most abnormal for a successful delivery service necessary in the ice industry, yet the ice delivery problem has been solved by the installation of the electric truck, designed and constructed especially to insure a protection from those elements which have heretofore been detrimental to establishing a profitable business.

New England E. V. A. Elects Officers

The New England Section of the Electric Vehicle Association of America has elected the following officers for the ensuing year: Chairman, J. A. Hunnewell, Lowell, Mass.; vice-chairman, E. S. Mansfield, Boston; secretary-treasurer, Leavitt L. Edgar, Boston; executive committee, Day Baker, Fred M. Kimball, Frank N. Phelps, Howard T. Sands, Frank J Stone, H. F. Thomson, Albert Weatherby, C. A. White, P. E. Whiting.

Day Baker, J. S. Codman and O. G. Draper have been appointed as a committee to arrange the transportation for the New England delegation to the annual convention at Chicago.

The Care and Preservation of the Battery

Recent Instructions Prepared by Experts on this Important Subject

BY R. C. NORBERG

New lead cells should be filled with electrolyte of 1.285 specific gravity, standing 12 hours before initial charge. Electrolyte should be kept at least ½ inch above top of plates. Rate for initial charge should not exceed ¼ of the 4 hour discharge rate—about 96 hours. No discharge until initial charge is complete. Temperature should not exceed 100 degrees F. Initial charge must continue until specific gravity reaches maximum, taking readings over period of 10 hours. Voltage will reach maximum of 2.55 to 2.65 per cell. Discharge and recharge once or twice before putting in service. Specific gravity should then be 1.290 to 1.300. Battery should never be discharged below 1.70 volts, or stand completely discharged. Should be inspected weekly. Evaporation replaced with distilled water. Cell readings on volt-meter and specific gravity readings on hydrometer every two weeks.

THE storage battery, or the propelling power, may be considered as the heart of electric vehicle. The life of the car and the efficiency of the service are absolutely dependent upon the battery. As simple in construction as the electric truck may seem, its battery is the one factor which figures prominently as an expense item. There are a number of reasons to which this unnecessary item may be attributed. Battery manufacturers have studied this condition, and as a result have arrived at a conclusion that there exists a lack of knowledge as to the proper care which should be exercised to obtain effective service.

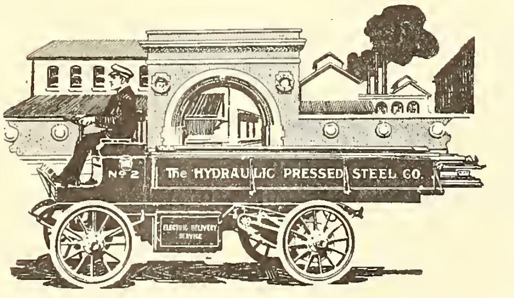
The majority of truck drivers at the present time are ex-teamsters. A common saying of the truck manufacturers demonstrates this fact repeatedly. One of their most convincing contentions is that the driver of a horse-drawn vehicle can assume the operation of an electric truck with practically no instructions. Herein lies an error which has resulted directly in the abuse and the sacrifice of the battery. As plain and simple as may seem the regulations relative to the proper up-keep, nevertheless they must be adhered to in order to obtain the best possible service at a minimum of expense.

For these reasons, and in an effort to prolong the life of the battery, the Willard Storage Battery Company of Cleveland has found it necessary to impress upon battery consumers the value of this knowledge.

Probably one of the most important elements consists in the initial charge. The cells should be immediately filled with 1.285 degree electrolyte, and care should be taken not to allow the wood separators to remain in contact with the plates any longer than necessary. After the cells have been filled with electrolyte, they should be allowed to stand for twelve hours before initial charge is started.

During the standing period some electrolyte is absorbed by the plates and separators and should be replaced with 1.285 acid. The loss from evaporation during initial charge should be replaced with water. The level of the electrolyte should never be allowed to get lower than ½ inch above the top of the plates.

The rate used for the initial charge should not exceed one-fourth of the four-hour discharge rate. The time required will be approximately 96 hours. It is not necessary to make the initial charge continuous, but if interrupted for some time it should be continued again until the cells have reached their full initial charge. The cells should never be discharged before they have received a complete initial charge.



During the initial charge care should be taken not to allow the temperature of the battery to exceed 100 degrees. If the battery shows a tendency to run over this limit, the charge should either be stopped or the rate reduced until the temperature goes down, but the proper number of ampere hours must be put in before charge is considered complete. Great damage might be done to the plates by allowing the temperature to exceed this limit.

In determining when the initial charge is complete, the gravity of the electrolyte should be used as a guide and not the actual time spent in charging. The charge should be continued until the specific gravity reaches a maximum.

After the standing period it will be found that the specific gravity is slightly lower than when the cells were filled, but as the charge continues, the gravity will keep on rising until it reaches a maximum, at which time the cells are fully charged.

To make sure that this maximum has been reached, the readings should be alike over a period of 10 hours. The maximum gravity of the electrolyte will vary between 1.275 and 1.300, depending upon their temperature.

The voltage will also reach a maximum which will vary between 2.55 and 2.65 volts per cell with the charging current flowing.

In order to obtain the best results, it is necessary to give the battery one or two discharges before putting the same in service.

Before the battery is put into service, the specific gravity of the electrolyte should be adjusted 1.290 to 1.300 degrees.

To get the best results from a battery, it should never be discharged below 1.70 volts per cell, with the vehicle running at full speed with batteries in series.

A battery should never be allowed to stand completely discharged. If it is not possible to fully charge it at once, give it a partial charge and complete the charge as soon as possible and before the car is used again.

The batteries should be regularly inspected at least once every two weeks. If the vehicle is arranged so that the cover of the battery box may be removed, it will not be necessary to take the batteries out of the vehicle. If the vehicle is not arranged in this manner, the crates containing the cells must be taken out for inspection. The rubber plugs in the center hole of each cell should be removed. By looking down into the cell the tops of the plates may be seen. The level of the solution must be at least ½ inch above the tops of the plates.

The depth of the solution may be ascertained by using a clean strip of wood or hard rubber. It is absolutely necessary to keep the plates covered with solution. The battery will be injured if this is not done.

All of the connectors between the cells should be examined to determine if any are weak or broken.

Evaporation is continually taking place in a storage battery. Ordinarily this is compensated for by adding distilled water. The proper time for adding water is at the beginning of a charge.

Electrolyte must not be added to replace evaporation, or to bring up the specific gravity, except where the level has been lowered by slopping or leaking. Some acid is also lost during the gassing caused by excessive overcharge. This loss is noticeable only after several months' operation and must be made up by a slight addition of acid.

With the battery fully charged, the specific gravity of the electrolyte should be between 1.275 and 1.300. The gravity of each cell in the battery should be tested with a hydrometer syringe at least once every two weeks, just after the reforming charge has been given, in order to determine if all the cells are in a uniform condition. Should the specific gravity in some cells be lower than in the majority, electrolyte must not be added to bring up the gravity. If the gravity increases in the low cells it is an indication that these cells have been run down lower than the others, and simply needed additional charging. If, with continual charging, the gravity does not come up and the temperature does not increase very rapidly during the charge, it is shown that the gravity has been lowered by the addition of water to compensate for a loss due to leakage, slopping or spraying, in which case the cell should be examined for the cause of the loss. If the loss has been due to sloppage alone, the gravity should be brought up by the addition of electrolyte, but if the jar is found to be broken, a new one should be substituted, new electrolyte (of the same gravity as that in the adjoining cells) put in, and the battery charged at the "finish rate" until the gravity of the electrolyte in the leaky cell has stopped rising, when it should be finally adjusted to the proper point. In the case of loss due to overcharging, the gravity of whole set will remain low. It is then best to continue the charge at finish rate for a few hours, and if gravity then still remains stationary 1.350 acid should be added to bring gravity up to at least 1.285 in each cell. But it should be clearly understood that no strong acid is to be added unless cells are fully charged up as indicated both by stationary gravity over a period of several hours and also free gassing.

As an additional indication of the relative condition of the cells in a battery, the voltage of each cell should be read with a low reading voltmeter at least once every two weeks; these readings should be taken just before the end of the reforming charge. Voltage readings must always be taken when the current is flowing, as they are of no value if taken when the battery is standing idle.

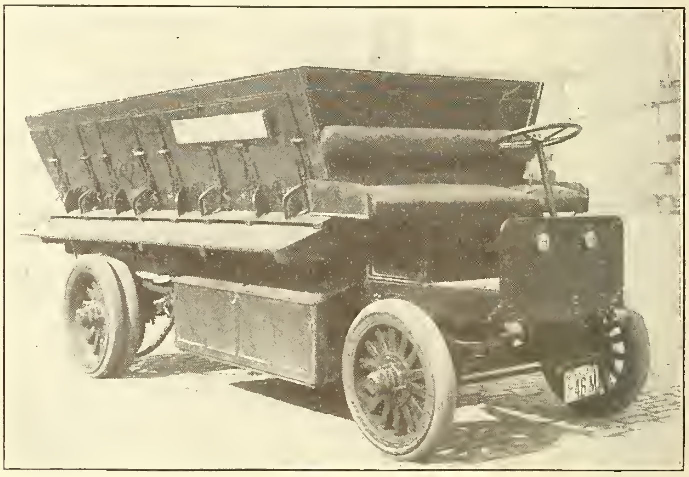
Should there be a decrease in the speed or mileage of the car while the current consumption is normal, there may be poor connections or trouble in the battery. Falling off in the capacity of the battery can always be traced to some cause and when it gives indications that something is wrong, the trouble should be located immediately and remedied.

Lack of capacity might be caused either by natural wear on the plates, by a short circuited cell, or a leaky jar, by the sediment reaching the bottom of the plates, or by constant undercharging of the battery. If no leaky jar is found, the battery should be given a reforming charge in order to remove any possible sulphate caused by undercharging.

The battery should be charged at the finish rate until the gravity stops rising in every cell, which in some cases might take several days. If this treatment does not help, the trouble is probably due to short circuits or sediment, in which case the battery needs taking apart, which we recommend be done at the factory.

As a battery is used, a deposit (sediment) collects in the bottom of the jars, due to the gradual wear on the plates. Great care should be exercised that the sediment does not touch the bottom of the plates, thereby short circuiting them and doing great damage. Before this occurs the cells should be cut apart and the sediment removed.

Experience has shown that the best results, both while charging and discharging, can be obtained when the battery temperature is between 70 degrees and 90 degrees, Fahrenheit. A considerably lower temperature will materially reduce the available capacity. This reduction, however, should not give rise to a feeling that the battery is failing, as a return to normal temperature restores the capacity of the battery. On the contrary, however, if the temperature for any considerable time is above normal, the wear on the plates is excessive.


An Atlantic Five-Ton Coal Truck.

If a battery is not to be used for several days, it should be charged up fully. If it is left idle for a time, not exceeding three months, it should be given a charge every two weeks at the finishing rate until the cells begin to gas freely.

Due to internal actions in the cells, a battery which has been standing idle for sometime will not give its full capacity immediately when put to use again, but might require several charges and discharges before it will give the same capacity as it did before.

If a battery is to be taken out of commission for a period exceeding three months, it should charge up in the usual way until the specific gravity has stopped rising in every cell. Remove the elements from the jars, pull the positive and negative groups apart; rinse the positive elements by dipping them in water. The positives should then be allowed to dry, after which they are ready to be stored away. The negatives should be put in electrolyte of 1.325 specific gravity for eighteen hours. After drying they are ready to be stored away.

The rubber separators should be rinsed in water. The wood separators should be thrown away and new wood separators put in the battery when it is assembled again.

When the battery is again put into commission it should be treated as a new battery.

Once every two weeks the battery should be given a reforming charge—that is, the charge should be continued at the finish rate after the battery has been charged the regular way. The charge should be continued until the gravity of the electrolyte has stopped rising, but never less than two hours. This will even up the cells and will tend to keep the same in good condition.

The specific gravity of the electrolyte will reach a maximum in the same way as the voltage, and readings of the same should be taken with a hydrometer syringe in every cell at the end of the reforming charge, in order to ascertain if the cells are in good condition.

If, in case of emergency, it is desired to charge the battery more quickly than usual, or, in other words, to hurry the charge, a higher starting rate (not to exceed 50 per cent over the regular starting rate) may be used for the first part of the charge, that is, until the "finish" voltage is reached. Then reduce the current to the "starting" rate and proceed as given above. Great precaution should be taken in charging at a high rate, as much injury can be done "pounding" a nearly full battery at a high rate. For special charge rates for certain industrial purposes further information on quick charging will be given on request.

A great many users of electric vehicles prefer to charge during the night. In order to ascertain the proper rate for charging, estimate the number of ampere hours which have been taken out from the battery, add 10 per cent to make up for losses, and divide the total by the number of hours you have to charge in. For instance, if 100 ampere hours have been taken out, add 10 ampere hours to make up for losses, making a total of 110 ampere hours. If the time available is 10 hours, the average rate to be used would be 11 amperes. If charging from an 110-volt circuit, the rate at the start should be 12 amperes, as when charging from a source with constant voltage the rate will drop as the charge progresses.

Never, under any condition, put the battery on charge through the night at a rate higher than two-thirds of the starting rate.

The utmost care must be taken to fully charge the battery, but it must not be excessively overcharged. Great care should be taken that the battery is not left on longer at the high rate than is given above, as this will tend to greatly deteriorate the plates and might even ruin the battery beyond repair.

This is particularly liable to happen if the battery is recharged every time after a short daily run, say, five or ten miles. In this case it is advisable not to charge the battery until at least 50 per cent of the capacity has been exhausted. If, however, the car is used for a short run and will not be used again for several days, it is necessary to charge up the battery immediately after returning.

Operations have been started by the Tiffany Electric Company, purchasers of the Flanders Manufacturing Company plant at Pontiac, and orders are on hand for over 100 cars. Shipments will be started in thirty days according to E. Le Roy Pelletier.

"Simple as an Electric"

"A feature of electric automobiles is their simplicity, both in operation and construction," says H. F. Thomson, secretary of the Electric Motor Car Club of Boston. "In fact, an electric is so simple that one frequently hears other types of cars described as 'simple as an electric.' Such a compliment is well deserved. The power plant of an electric car consists only of a battery, a controller and a motor. The energy for driving the car is stored in the battery. The controller, as its name implies, controls the car's speed. The motor is the driving unit. When the car is being driven, the electrical energy is delivered by the battery through the controller to the motor. The motor transforms the electrical energy into mechanical energy, which is in turn delivered to the wheels of the car by a mechanical connection such as a shaft or chains.

"In driving an electric car there are three functions to be attended to: First, the steering; second, the braking, and third, the controlling of the speed. The operation of the first two is common to all automobiles; the simplicity of the third is characteristic of the electric alone, for the operation consists in moving the single controller handle. Even reversing is in general accomplished by a backward movement of this same lever.

"The motor is one of the vital organs of an electric car. It consists of a cylindrical iron shell or frame about twelve inches in diameter by fifteen inches in length. At the center of this frame is the armature, which revolves. Attached to the inside of the frame are four blocks of iron whose curved faces fit very close to the armature. These are the field poles. Around each of the poles is a coil of wire called the field winding. At one end of the armature is a ring made up of many copper strips set side by side—this is the commutator. Four carbon blocks, called the brushes, rub on the commutator. A wire connects the brushes to the fields so that the current passing through the armature also passes through the fields. This connection constitutes a 'series' motor. The whole unit is of the general type which is almost universally used on electric street cars.

"A feature which tends to simplify the operation of an electric car is the automatic action of its motor. Without any change in the position of the controller handle the motor will slow down whenever the car begins climbing a hill, and the amount of the slowing down increases with the steepness of the grade. Again, when the car reaches level ground or is coming down the hill the motor will speed up and the car will run faster. This automatic action of the motor is a great advantage in favor of this type of car, because it guarantees that the speed of the car will be in keeping with the kind of work the car is called upon to do.

"The controller of an electric car is made up of a number of stationary copper fingers which press against a drum. As the controller handle, which is attached to the drum, is moved the stationary fingers touch different portions of the drum. This movement changes the electrical connection between the battery and the motor, so that the car will run at different speeds. Generally the car will have five speeds, though it is not desirable to run for a great length of time on the first and third notches.

"The battery is at present receiving more attention from the electric vehicle interests than any other feature of the electric motor car. The battery is the distinguishing feature between the electric automobile and all other types. Whereas a few years ago a car could travel only forty miles on a single charge of the battery it is today common practice to build cars which will travel eighty miles or more on a single charge. Speeds have improved in almost as great a proportion. Stock cars can now be obtained which are guaranteed to cover one hundred miles at an average speed of twenty miles per hour. Thus the electric car has been raised from a comparatively slow machine whose range of travel was very limited to a car whose speed is about as high as compatible with comfort and safety and whose range of travel is more than ordinarily required in a day's run."

Service and Electric Trucks

During the last eighteen months manufacturers of motor trucks seem to have come to a keener realization of the importance of giving real service to owners than at any other period in the history of the industry. Truck buyers are also beginning to appreciate more and more that the truck deserving of their confidence is the one backed by a service station, well equipped and manned by a competent force. Buyers of trucks are also beginning to see that the maintenance of a big service investment on the part of the larger manufacturers is an evidence of their stability and determination to keep their customers' machines on the job, moving goods and doing satisfactory work.

In commenting on the service co-operation which every motor truck owner has a right to expect, W. K. Chilcott, general sales manager of the General Motors Truck Company, points out that "Service should not be considered the gratis distribution of parts and labor, but rather a disposition on the part of the manufacturers to insure the activities of an owner's haulage or delivery department.

"Service co-operation may take the form of supplying and installing parts that are worn or broken, or in case of a truck being disabled through accident, it may mean the furnishing of a spare truck which temporarily takes the place of an owner's machine, thus avoiding a tie-up in delivery operations, often entailing great inconvenience and possible loss of business.

"Seasoned motor truck owners realize that this sort of interest and co-operation from commercial vehicle manufacturers is motor transportation insurance of the highest type—insurance that is just as valuable to the owner of one truck as it is to the big houses maintaining from 5 to 50 machines.

"Truck owners are rapidly coming to realize that the service co-operation of manufacturers cannot always be free. Where it can be demonstrated that the fault of the failure of the machines rests with the maker, it will be found that there is always a disposition to make repairs without any charge, but it would be manifestly unfair to expect the service station to pay for breakages that follow the abuse of a machine, overloading, careless driving, over-speeding, etc. In such cases it is fitting that a charge be made, but usually the house that sold the truck is in a better position by reason of its knowledge of the machine and by its possession of needed parts to put it in shape again at the smallest cost.

"This sort of service is of great value to the smaller owner of commercial vehicles; but it is also a big factor in the maintenance of a large fleet.

"Without the help of the service station the smaller concern would operate its motor trucks under a decided handicap. The service station tends to equalize the large and smaller owners. It puts big and little companies on an equal basis.

"With the big service station at his disposal, a man with only one truck can get all the help possible to the large department store or express company that operates 100 trucks and maintains its own private garage.

"A large number of business men who might otherwise have hesitated in the installation of power wagons because of the fear that they lacked the facilities to keep them in shape, have been won over to the use of trucks by a knowledge of the kind of service they can secure from the plant of the maker, his direct factory branch or his agent.

"In fact, service is considered such a big element in the sale of a motor truck that today many judicious purchasers of trucks are declining to treat with firms that lack the facilities and the men to insure satisfactory performance of their machines every working day."

Trucks in Philippine Service

Manila has the honor of having the first electric truck installed in the Philippine Islands. The truck, a ton capacity, was used practically in the city of Manila. The highways about the islands are unimproved, in fact, mere paths. However, the principal cities are rapidly establishing standard roads, which will open a new field for the electric vehicle.

The United States War Department has recently purchased nineteen machines, all of which are employed in the hauling of supplies, etc. Government officials claim that they have solved the problem of distributing supplies, regularly and quickly.

Four machines are employed by business houses for private use. In each instance the trucks are performing remarkably, and deserve much consideration, in view of the fact that the conditions are so unadaptable to this field of industry.

Sixteen trucks of different capacities are being constructed, and will be sent to the islands early in the spring. With this shipment, the General Vehicle Company will have a total of 39 wagons installed in the islands.

The utility of the electric machine has been so positively demonstrated that it is believed during the coming year the number of machines will be greatly increased.

Electric Shows Possibilities

A striking feature of the possibilities of the electric is displayed in a record made by Mrs. W. M. Hoyt, of Chicago. On August 8 of this year, Mrs. Hoyt became the possessor of an Argo coupe. Up to September 2 the electric had covered 2,571.6 miles, or an average of 59¾ miles a day. Mr. Metzger, of Metzger-Herrington Company, claims that this is one of the many instances in which the Argo has created an enthusiastic fan for the electric vehicle.

Features of the Modern Show Room

The Metzger-Harrington-Argo's Example of Up-to-Date Practice

BY FRED B. SCHAFER

PUBLIC opinion ultimately decides the type of nearly every article universally used. The trend of this powerful influence is responsible for the success or failure of an industry promoting a new product.

It is a well established fact that, as worthy as a product may seem, the most important steps to success are the methods employed in placing the product favorably before the public.

Effective advertising campaigns have, in a great many cases, popularized the subject of manufacture, and have consequently educated prospective consumers. However, as efficient as this method may seem, a great many industries have failed to arrive at the expected success. Much interesting discussion has been advanced on this point, resulting in the modern theory that in order for an article to market rapidly, there must exist a characteristic which creates a desire for possession. Herein lies the secret to the success of the automobile which has been solved by the manufacturer. How true is the thought, "the country has gone automobile crazy." This condition is precisely the result which is necessary to the advancement of an industry.

Exterior View of Show Rooms.

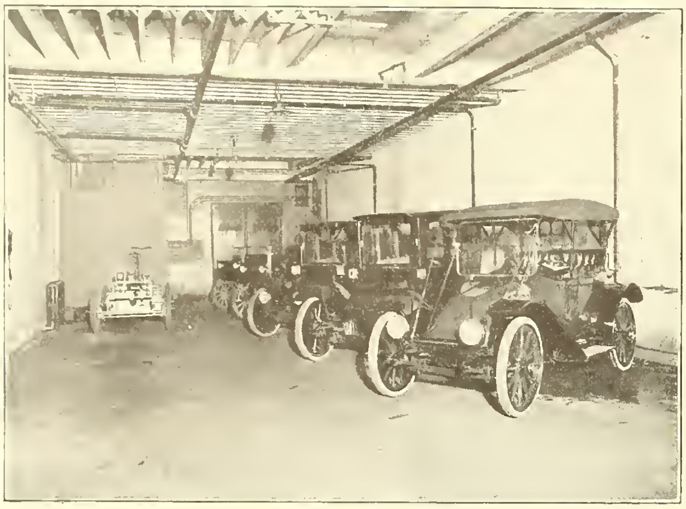
Manufacturers have studied carefully the reasons to which this world wide enthusiasm may be attributed. Having granted—for it is an undisputed fact—that the automobile like any other worthy product, furnishes efficient service, the question arises as to the element which has created the desire, and the resulting success. Manufacturers, having produced a technically serviceable machine, devoted unrestricted time and energy in perfecting a self selling element, beauty and luxury obtained through excessive expenditure. Humanity are lovers of those things which are graceful and attractive, and in securing these characteristics, expense has been an unconsidered item. This important factor has been so scientifically matured, that at the present time, the general outlines are in harmony with the most artistic theories. In fact, the appearance is the factor which is self convincing, and which makes of its admirers, prospects at first sight.

In the electric vehicle division of the industry, this successful effort is more readily visible. The simple mechanical construction having been perfected, car builders have obtained the maximum of quality in more graceful lines, parlor like trimmings, upholstery, fixtures and the absolute comfort obtainable from its spacious cushions. All these existing features represent a lavish expenditure in securing the unsurpassable beauty and taste that have made the appeal, the answer to which is universal success.

Interior of Sales Manager's Office.

Sales and Show Rooms of Metzger-Harringtan Company.

Not only has this method been employed in the manufacture of the vehicle, but likewise in the construction and equipment of sales and exhibition rooms. A great many firms have felt the necessity, and have consequently conformed to the original idea employed in the building of the car. With this view in mind elaborate interiors have been installed where prospective purchasers can find conditions similar to those presented by the vehicle. In the electric vehicle trade, women figure prominently, and for this reason there arises a demand for appropriate surroundings calculated to encourage women to make their own individual choice.



Argo Service Station.

Probably one of the most elaborate auto show rooms in existence is that of the Metzger-Herrington Company, of Chicago, national distributor for the Argo electrics. Located at 2412-14 Michigan avenue, in the heart of Automobile Row, the show-rooms represent a modern equipped exhibition room, sales office and service garage.

Large and spacious, the interior contains soft toned walls, paneled in solid mahogany, inlaid with Grueby faience. The ceiling is beamed with heavy carved mahogany beams, relieved by ornate panels, the gold leaf used in the decoration of which has been estimated at $1,500. Six massive and artistic electroliers suspended by gilt chains, four side wall electric flambeaux, and many concealed ceiling lights with softly shaded Holophane globes furnish a lighting effect that is unsurpassed. Artistic architectural erudition is displayed in the simplicity of the pure white flint floors, in the center of which a panel of nearly 30,000 tiles is offset by a handsome border design of Grueby faience in dull blue, red, yellow and green that harmonizes perfectly with the color scheme of the interior decoration.

The furnishings are entirely in mahogany to match the woodwork. Soft green rugs, luxuriously upholstered Spanish leather chairs, and the restful green of many growing ferns, make the interior bright and attractive.

In the rear of the main room are the private offices, paneled in mahogany and leaded glass, with concordant rugs and mahogany furniture.

Immense double doors of solid mahogany separate the salesroom and the private office from the garage in the rear, which has every facility for the most efficient care of the electric.

A wide mahogany stairway with soft green carpeting leads to the show-rooms on the second floor. These are in dull white finish with handsome mahogany woodwork, and artistic decorations on ceilings and side walls. In the rear are spacious stock rooms and a completely equipped repair shop, connected with the garage on the main floor by an elevator.

The private rest room for women, with telephone facilities, lavatory, writing desk, reading tables, rugs and comfortable upholstered chairs, dismisses anxiety at times when patrons are obliged to wait while repairs are made on their cars. No expense has been spared, and no detail or convenience overlooked, in the construction of this factor in the success of the industry.

Philadelphia to New York City

The Woods Motor Vehicle Company recently found a prospective purchaser in New York, who wanted to see a new Woods model, not then in stock in that city. W. S. Cranmer, of the Philadelphia branch, drove one of the new cars to New York for the customer's inspection. The running time each way was a trifle under seven hours for the one hundred and four miles. This distance was covered on a single charge of electricity with a comfortable margin of power in reserve. One of the passengers on the return trip enthusiastically described the ride as the most comfortable and the cleanest automobile ride, of like distance, he had ever taken.

It will be recalled that Mr. Cranmer made a most remarkable trip in a Woods electric in 1909. He drove a Woods car from Philadelphia to Pittsburgh and return, covering a distance of twelve hundred and seventy-five miles, much of it over rough mountainous country. The electric car has developed wonderfully in power and efficiency, as well as outward appearance since that time.

Kansas City Newspaper Adopts Electrics

According to information just received from Kansas City, the *Star,* after trying out a number of foreign as well as American trucks, became convinced a few months ago that the electric truck was the logical type for its delivery service. Consequently an electric was purchased and it has met with the requirements of the service better than any other motor wagon previously used.

The successful work done by the electric has led the *Star* officials to believe that their business needed a greater number of wagons. As a result three G. M. C. vehicles were purchased.

G. C. Ayres, Detroit manager for the General Motors Company, has announced that the Kansas City *Star* has found the G. M. C. trucks so capable that it has closed a second order for a fleet of nine 1-ton vehicles.

Kansas City has a great many hills and more or less unimproved roads. The newspaper delivery service is a service which demands a most severe test on all motor vehicles. The electric has negotiated them successfully, and in fact, the Kansas City *Star* officials claim that they would be at a loss without the efficient service which their fleet of electrics supplies.

Electric Vehicles

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CHICAGO, OCTOBER, 1913

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READY FOR THE CONVENTION.

OVER at the Hotel La Salle, on the northwest corner of La Salle and Madison streets, Chicago, preparations are completed for the biggest convention of electric vehicle men ever assembled. From the morning of October 27 to midnight of the 28th—and as long thereafter as may seem appropriate in individual cases—will be one continuous fest of business and pleasure. The business will be a pleasure in itself, while the pleasure will have at least the business characteristic of a common interest.

There is no danger that the electric vehicle convention will either become afflicted with technical dry rot or degenerate into a mere junket. The men of this industry are earnest, enthusiastic and aggressive. They are bending their supreme effort to make the electric vehicle industry bigger and more substantial than anything else in the field of transportation. The convention is the culmination, the climax of the year's work—a clearing house for all the ideas that have succeeded or failed in the past, and for all that will be tried in the future. Not to show an interest in it is to confess oneself out of harmony with the march of its progress. The object of the vehicle men in getting together is to promote better business, and in that purpose they will surely succeed.

STUDY THE WORK TO BE DONE.

AT the present day there should be no necessity of convincing the business man confronted with the delivery problem as to the advantages gained by the truck over the horse.

In any comparison of transportation problems on city streets, the truck is a more familiar sight than the horse. It is not so much then for the business man to decide as to the profitableness of truck delivery service as it is for him to decide the individual type of machine which will do his particular work best.

Having granted—for it is a matter of record—that the horse is unprofitable, a decision as to the type of motor vehicle to adopt becomes necessary and is dependent upon the conditions under which the vehicle must work.

Broadly speaking there are but two types—gasoline and electric. For both much can be said, and no comparison of their service is needed. Each has its separate field and a careful study will disclose that the two do not conflict.

Under certain conditions, the gas truck would perform the work more successfully than the electric, whereas under other conditions the electric would prove more worthy than the gas truck.

It is a suggestion well worth consideration that the prospective purchaser make at least as careful a study of the field in which the vehicle must work as he does of the machine itself. He can then readily decide which type of vehicle will perform his work most succssfully.

THE BATTERY.

THE success of the electric vehicle has been due to the development in the perfection of the storage battery. The battery of ten years ago and that of the present day can hardly be compared with the same breath. As the battery has advanced the vehicle has advanced, and resultingly the success of the industry. However, as rapidly as manufacturers have discovered processes which would prolong the life of the battery, the sales increased in the same ratio, vehicle owners relying solely on the original ability of the battery. With any product, the exercise of proper care in accordance with specific outlined regulations prolongs its existence and promotes a continuous service. In the case of the battery the average user is entirely uneducated. Accurate battery knowledge is hard to obtain. Experts in the manufacture are practically the only source of information. In fact, the battery, the heart of the electric vehicle, has been introduced and has remained as a mystic mechanism, which is used until it fails to perform. The battery performs on its original virtue, strengthened at no time by adequate attention. Thus has the vehicle industry advanced solely on the efforts of battery development. Vehicle manufacturers confess that without the proper battery equipment the vehicle is of no value. Then, is it not time to promote a movement whereby consumers can be educated as to the proper care of the battery, the result of which will make it possible to gain a one hundred per cent battery value? The garage man, the consumer and the central station are constantly increasing a demand for a school of instruction, which will enable them to obtain authoritative knowledge of the proper care and use of the battery.

"DO IT ELECTRICALLY."

"DO it electrically"—that is the slogan today, and it is a good one. Steam power, gas power, and animal power are receding, giving away to the greatest industrial force on earth.

The electric truck is one of the foremost mediums of demonstrating the commercial value of the electric current. Manufacturers have demonstrated the truth of this and have asked central stations to stimulate the use of electrics by utilizing them in their own service first. This is merely a forethought for the future success of the industry, and the central station, with its opportunity to increase its annual volume, should be the first to show interest.

The modern electric truck is not at the bottom of the list of current consuming devices; on the contrary, it is at the top, and constant "boosting" and co-operation on the part of the central station will aid in teaching the public that the electric is a necessary factor in improving delivery conditions.

Electric trucks mean less congestion, cleaner streets, fewer maimed horses and lower cost of delivery for both merchant and consumer.

Let us suggest that the central stations "practice what they preach," and as a direct result aid in the betterment and the advancement of this field of industry.

THE ULTIMATE METHOD.

IT has been unquestionably proven and demonstrated that the electric truck is the ideal method of delivery. Not only is it superior in the particular advantages of economy and service, but also it has many decided general advantages. The electric is odorless, noiseless and sanitary, and evidence of the user's progressiveness. Free from the dangers of fire and explosion, it effects no change in insurance rates, and contains no fire risk within. It carries a low rate of insurance on itself, and is not restricted from warehouses, shipping docks, or other places, on account of fire hazards.

In the operation of an electric, no skilled or high-salaried mechanic is necessary. Present horse-drivers, already familiar with the route and conditions, can readily be developed into competent electric truck operators. It can be stopped and started without loss of time, and when idle, consumes no power. There are no gears to shift, nor engine to crank. It can be driven and maneuvered with the utmost ease, and accelerates from a stand most rapidly. The fact that it cannot be driven at an excessive rate of speed makes it correspondingly free from the wear and tear from this source. The life of the electric is from ten to twelve years. The electric requires the least possible amount of attention, the least possible loading space, and the least possible space for housing. These are but a few of the reasons for using the electric. Sufficient is it to say that for all classes of work under ordinary city conditions, it is the ultimate method of delivery.

A FACTOR IN THE WORLD'S PROGRESS.

MANUFACTURERS are coming to make a study of the influence of the electric vehicle upon the world's progress, and the reasons why people buy electrics. Probably there exists no industry which has done more for the education, social uplift, health, business and general welfare of the civilized world, than the automobile; and considering the fact that the industry is hardly past the swaddling clothes period, when compared to the age of civilization, it is impossible to estimate what untold blessings the future has in store for humanity as influenced by the automobile.

Business cares, financial worries, and the troubles of the office routine are engulfed in the healthful, invigorating and uplifting pleasures furnished by the machine in its tour through districts with new subjects and scenes both educating and interesting. The local tourist can cover a large field in a short time. Each trip represents an unexcelled advantage in the opportunity to learn, every scene and object being presented to the vision in the light of novelty.

The electric vehicle, in its stimulation of scientific research, invention and engineering skill, has advanced the dial of progress. It has conquered the inhabitants of the city, and has gained a foothold in the suburbs. The owner can go to his business in the city and still enjoy the delights of the country. It is indeed a fact that the electric has reached every class, section and condition, and has exerted its influence for a wonderful good.

REPAIRING STORAGE-BATTERY TANKS.

A fairly successful way of repairing cracks in the hard-rubber tanks sometimes used as containers for the electrolyte and plates of storage cells is as follows:

The plates and electrolyte having been removed, and the rubber wall which is to be repaired thoroughly dried, a hacksaw blade is employed to widen the crack sufficiently for the insertion of an ordinary rubber band. Then a little sulphur is sprinkled over the band and a hot soldering iron applied. Thus the break is subjected to a sort of cauterizing process.

Touring Around Milwaukee in an Electric

The Milwaukee Journal's Country Road Test of a Woods Car

BY EUGENE HANDSELL

BELIEVING that too many persons possess an erroneous idea regarding the mileage that it is possible to make with an electric roadster, the Milwaukee *Journal* decided to put an electric vehicle to the test.

At 11 o'clock one fine morning a Woods electric started from the *Journal* building, headed toward the western country with Waukesha as the objective point.

The day was ideal, but the roads were not in that pink of condition that is so typical to the Blue Mound road. The daily rains for over a two weeks' period had their effect upon the road and here and there the ruts were deep and particularly so just prior to approaching a hill.

It was decided that the car should be first sent over the country roads because too many drivers of electrics are timid about leaving the city streets. So much beauty abounds in the nearby country that it is a pity our women owners of electrics do not take heart and imbibe the beauties that lie at their hand.

There were not many rules that governed the test to which this electric was put, other than that it should make at least thirty-five miles of country road and afterward visit the parks of the city, all on one charge of electricity, with the mileage noted.

The electric roadster, with Emil Estberg, the local agent, at the wheel, started south on Fourth street toward Grand avenue. The car wended its way up Grand avenue hill to the boulevard beyond Eleventh street, bending westward to the great concrete viaduct which spans the Menominee valley. No sooner was the smooth running pavement of the viaduct covered with the easy glide of the electric than the steep hill just prior to reaching the Blue Mountain road was scaled. The hill was made with apparently no effort on the part of the car, despite the fact that ruts and humps and depressions here and there were in conspicuous evidence. The representative of the *Journal* promptly had mental visions of a stalled electric upon a hill with the possible necessity of calling upon some nearby suburbanite, owning a husky team, to pull the car out.

Woods 1914 Model Roadster.

The electric, however, soon cast out such imaginary troubles, for without a quiver or a waver the car went on its way.

The beauty of the wooded country and the pastoral scenes that presented themselves, both to the right and left, had their beneficial effect upon the touring party. The "half-way house," between Milwaukee and Waukesha, was reached after a delightful ride on the country road and then a short pause was taken. An occasional glance at the voltameter showed that no perceptible drain had been made upon the battery. The rolling roads covered, together with the beauties on all hands, and the gentle rocking on the resilient springs which supported the car, made the running comfortable and interesting, until Brookfield Junction was reached. Another stop was made at this junction.

The car forged ahead toward the west, passing rich fields and ripening grain and waving corn until the indications, through the appearance of homes located more closely together than along the country roads, demonstrated that it was nearing the city. Soon the beautiful city of Waukesha hove into sight.

While the occupants of the electric expected the country roads to be a real "hazard" the crossing of railroad tracks, street crossings, etc., were really more of a trial, but the car went on undaunted until five points, the center of the city of Waukesha, were reached.

Just as the car was turning about to start upon the return trip the clock in one of the friendly towers seemed to bid a kind farewell, and off it started. The trip was uneventful, other than a thorough appreciation of the soft cushions and gentle motion; solid comfort that the riders were steadily in, and not the least bit of inconvenience through road weariness presented itself.

The travelers reached the city of Milwaukee in splendid time and partook of a light luncheon, only to begin the tour about town after having covered practically thirty-five miles of country road. Another look at the voltameter just as the car turned up in front of the Journal building showed that only a few degrees were recorded.

After luncheon there was a change of drivers. The car was again started off on its tour about the city, visiting the various parks.

Winding in and out and about Washington park, the car was off again, now headed for Mitchell park on the south side. The sunken gardens and every nook and cranny of the park was taken in by the auto party, viewed from each winding road that traverses the park.

The extreme southern part of the city was now visited and some of the going was not of the choicest sort, for it was necessary to often plow up a lot of not too finely crushed stone. Surely the car was being put through a test that would have been a sufficient one had it just come out of the garage newly charged with its full voltage, but here was a car that already traversed about thirty-five miles of country road, a considerable distance in the city, and through a number of parks, and now was successfully rolling along, and over a number of pieces of miserable city squares.

After visiting Kosciusko park the car headed toward the center of the town, only to be sent toward the East side to answer the call of beautiful Lake park, then northward to the Whitefish Bay road through the wood-flanked road, with the lake peering through here and there, until Whitefish Bay resort was reached. The trip through the lake breeze-kissed district was extremely enjoyable and the return trip equally interesting. Anon the Lake park entrance hove into sight and the winding, splendid roads of the park were altogether too inviting to resist. In and out over the bridges that span the chasms and ravines, passing the pavilion and golf links and on beyond the lighthouse, the car soon reached Wahl avenue. The voltameter showed that there was no need of any concern about being without power for still a long time, so another trip to the center of the city was made.

Having exhausted every possible trip within the city, the representative of the *Journal* decided that the tour be abandoned and Mr. Estberg agreed to take the party up Juneau hill and out again toward Lake park to his residence.

Prior to starting out upon the test, in order to ascertain just what could be expected of an electric car, a careful examination of the mileage meter was made and it was found to read 132.5 miles. After completing the entire trip the meter read 209.8 miles, which showed that 77.3 miles had been officially covered. The performance must be conceded as satisfying to any one who doubts that the modern electric can be relied upon for trips over country roads for a reasonable long distance, all made upon charge.

Upon examination of the voltammeter it was clear that possibly ten or fifteen miles more travel could be secured with the car without exhausting the power. Mr. Estberg decided to continue to drive the car about town from this point onward and reports that a little over 14 additional miles were made without entirely exhausting the power. Adding 14 miles to the nearly 78 mile covered officially, give the car credit for having covered practically 92 miles on one charge of electricity over a course of about 35 miles of country road and 57 miles of none too best of city streets.

The Argo Service Truck

In order to insure a service which will make it possible for Argo owners to receive the use of their cars 365 days in the year, the Metzger-Herrington Company, of Chicago, has installed a service truck for emergency cases of disablement. The truck, which is kept exclusively for immediate response to trouble calls, consists of an Argo chassis with a body built especially capable of carrying equipment sufficient to correct any difficulties which may arise.

A large cabinet built in the body contains a number of trays which are stocked with a complete set of tools, and with every type of bolt, screw, nut, counter-pin, washer, or minor part which may be used in repairing Argo electrics. An extra set of wheels of various types are held stationary by frames built into the body.

Argo Emergency Service Wagon.

An interesting feature consists in a tow-hook which extends from the rear of the truck. This hook, used for hauling badly disabled cars to the service station, is welded into the frame of the chassis. This arrangement distributes the strain evenly throughout the car, which absolutely avoids any congestion on the axle.

The truck and equipment, 2,900 pounds in total weight, is equipped with two 40-cell, 13 thin plate exide batteries, and Motz cushion tires. Capable of making thirty-five miles an hour, the truck finds little difficulty in reaching and restoring quickly, service which has been temporarily interrupted.

Electric for Street Cleaning

Berlin, Germany, has installed eighteen battery-driven sprinkling and scrubbing machines, the total daily operating and maintenance cost of which has been figured at $4.41 each. Departmental figures show that the daily cost of each of ten horse-drawn machines is $4.57. Each of the electrically driven machines cleans 55,496 square yards in the average eight-hour day, whereas each horse-drawn machine cleans 44,013 square yards in the same time. That is, the electrically driven machine accomplishes over 26 per cent more work at about 4 per cent less cost, and is consequently about 30 per cent more economical.

Advantages of Motor Cars in Cotton Manufacture

Paper Read Before the National Association of Cotton Manufacturers

BY DAY BAKER

IN 1909, only a few of the textile mills in the country had attempted the use of motor vehicles for their yard work, but since that time the introduction of motor trucks, especially those propelled by electric power, has increased in the northern states with a steady, healthy growth. This paper is illustrated with some of the mill and factory installations of motor vehicles in the New England States, in which section it is my privilege to know and meet many of the manufacturers. I am a great believer in illustrations. A few good photographs of motor vehicles performing in actual service seem to be far more convincing to the practical mill man than pages of well prepared arguments. Therefore, it is with pleasure that the illustrations are shown to give the evidence to substantiate the claims which are made.

The problem which, I am happy to say, many mill and factory men have solved, still confronts many agents, superintendents and yard masters; the problem of the proper, expeditious and economical handling of the raw material as it arrives, as it passes through the various processes until it becomes "finished goods," and then is delivered to the storehouse or to the freight house, where the responsibility of distant delivery is turned over to the railroad or steamship line.

Not only are the problems of transportation encountered in handling the actual raw material, material in process, and the finished goods, but in the many contingent parts of mill work there also arises numerous calls for transportation of some character, which work can usually be much better done by motor vehicles than by any other method. As an example, it was recently arranged that an electric winch be applied to one of the yard trucks of a Lowell textile plant. With this electric winch freight cars will be pulled out of a freight shed where locomotives and gasoline driven vehicles are prohibited. This winch will also be used for loading heavy cases. The truck will as well be used for shifting freight cars around the loading platform. These are only a few of the many diversified uses to which an electric truck may be applied.

The bales of cotton or bags of wool and other raw material or general supplies, if not delivered by the railroad direct into the storehouse, must be carted there.

Perhaps it is then necessary to team it to the picker room, to start it on its long journey through the course of manufacture.

After being spun into yarn, it may be necessary to transfer it to a somewhat distant mill before it can be utilized.

The goods being woven may have to be carted to the bleachery, the dye-house or the finishing departments, and from these to other departments or to the storehouse, and perhaps later to the freight house.

Not every mill is so fortunate as to have its coal delivered from the railroad cars or boats direct to its coal sheds or boiler rooms, and therefore many mills are confronted with the additional problem of the transfer of coal from railroad lines and wharves to their own storage, and from there to their boiler rooms, many mills making two, and some, three transfers.

After the process of combustion, the remnant of the coal (the ashes) must be carted to such places as are being filled, or to the dump. Three of New England's large textile mills are making a profitable business of selling their ashes for sidewalk construction and filling purposes, making deliveries by motor trucks.

The material for shipping boxes does not come in on wings; it requires hauling to the carpenter shop and from there as boxes to the finishing room or shipping department.

The barrels of dye and bleaching materials will not roll themselves to the storehouse, and from there to the dye works or bleachery; they must be teamed, and their weight is such that they make heavy loads.

Lumber must be moved to the various places around the mill yard where repairs are going on, or if construction work is in progress, bricks, lime, cement, crushed stone and gravel must be carted.

These are some of the many problems that confront the superintendent of the mill or factory.

THE HORSE DRAWN PERIOD.

Years ago almost the only means employed in transportation in the mill yard was the slow-plodding oxen, and even now you will occasionally find a few yoke of them slowly drawing their cumbersome trucks loaded with material or finished goods.

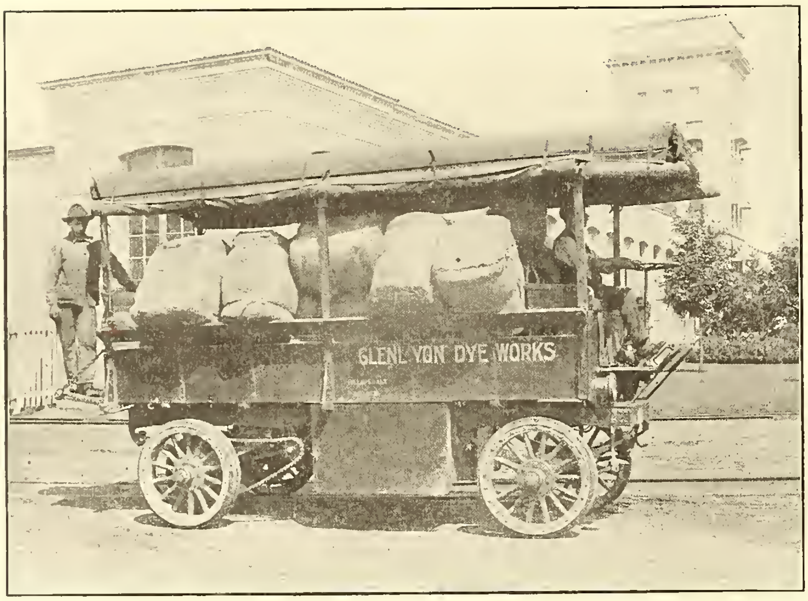
Later, as the world progressed and speed became one of the requirements, the more flexible and faster moving animal, the horse, was introduced for service around the mills. The horse, man's faithful friend, has done great work, but his day is fast going. The increase during the past few years in the price

One of the Two-Ton General Vehicle Electric Trucks in Use by the Nashua Mfg. Co., Nashua, N. H.

with the rise in cost of all kinds of feed, is fast putting the horse in the list of luxuries. In addition to the high cost of the horse and his keeping, we are, with the keen competition of the twentieth century, calling for an increased amount of work in a given time, less manual labor, a speedier transfer of goods, and improved hygienic conditions around our manufacturing communities.

According to one of our best writers on health subjects for the masses, 40 per cent of the disease and deaths accounted for by our hospitals may be directly traced to the horse, which aided by the wind, the fly and the rat, scatter broadcast death-dealing germs. ("The Horse vs. Health," by Harold Bolce.)

It has also been shown by highest authorities that delays in work caused by sickness or death among employes are not only a distinct economic loss to a town, city or state, but also affect the cost of manufacture. Therefore, for the reasons given above, and for the additional good reason that a better and cheaper method has been found, the day of the horse around mills and factories is on the wane.



Two-Ton General Vehicle Electric Truck Used for Freight Service Between Sayles Bleachery, Pawtucket, the Dye Works at Phillipsdale, and Freight from Providence, R. I., by the Glenlyon Dye Works, Phillipsdale, R. I.

TWENTIETH CENTURY METHODS.

We no longer weave by hand, nor do we travel by the stage coach, and as the world moves, so the conditions around the factories and mills change. Therefore, we should no longer cling to the use of brute force for the transfer of heavy weights. The lightning, subdued by the brain of man, and harnessed by the generator and motor, now stands ready to do our bidding, better, quicker, cheaper, and without the unhygienic conditions which surround the stable and the horse.

In order to avoid the fire risk entailed with steam locomotives, various experiments have been made in yard transportation, with compressed air. One of the experiments met with considerable success at the Plymouth Cordage Works, where small locomotives supplied with compressed air drew and shifted industrial cars. But this method was finally abandoned.

In some instances, tracks and industrial cars, drawn by small steam locomotives, have been installed in the endeavor to better yard transportation, but the work of almost any mill is of such a varied character that the network of tracks required to reasonably cover the routes desired, the cost of laying them, and keeping in repair, more than offset their apparent saving. And then, again, it is often desirable to use the mill yard vehicles around the town or city, outside of the mill property on the public highways. This cannot be done if industrial rail cars are used. Therefore, trackless transportation in and around mills is really what is required.

As vehicles operating around a trackless mill yard and town or city roads must be supplied with power, the nature of the motor is first to be considered. At once gasoline must be discarded except for long runs outside of mill or factory yards, not only on account of the expense of operation and maintenance, but on account of the serious fire risk involved. Electricity seems to be the most natural power to be considered, not only on account of its cheapness, but because of its cleanliness, safety and flexibility. Therefore, the logical method of transportation for the mill and factory yard is trackless, electrically-driven vehicles. As the conditions are trackless, the vehicle used must be self-contained, which means that its power, derived from the generator, must be accumulated in storage batteries; therefore, we have given as the desirable method of transportation an electrically driven, storage battery truck.

In considering any method of transportation there are three things to examine: the road, the load and the vehicle. In trackless transportation the road must be accepted as it exists. In mill work the load must be accepted as it is received, and it must be delivered as ordered. These two factors of transportation are the same, no matter what method is employed. Hills, bad roads, frequent stops and starts, long routes or heavy loads are equal in the demand made on animals or machines of any kind. The third factor, the vehicle, is the only one with which the solution of transportation problems can be made any easier.

Just as the electric street car has solved the problem for passenger transportation in cities, so has the electrically driven truck opened the way to a simple freight and delivery system around mill and factory yards, and towns and cities.

THE ELECTRIC VEHICLE.

The electric vehicle for trucking and delivery is purely a mechanical proposition. It is a machine. Like other machines it can be built to do a given amount of work in a definite time at a certain cost under any known conditions.

The safely carried load in pounds or tons is the basis of its mechanical design and construction. The specified speed with full load on hard level determines how much power will be required. The specified duration of continuous operation at full load on a hard level determines the amount of energy that must be stored in its battery at one time. This last condition fixes the size of the storage battery. The power and speed required determine the size of the motor and the gear ratios, while the total weight affects the tire design.

The cost of transportation by electric vehicles can be determined just as logically as the cost of operation of any other machine. It is merely a question of measuring the work and measuring the cost and placing one

MERRIMACK MFG. CO. LOWELL, MASS.
MERRIMACK MFG. CO. LOWELL, MASS.

Two-Ton General Vehicle Electric Trucks in Use by Merrimack Mfg. Co., Lowell, Mass.

against the other, as any business man knows.

Accurate engineering can be applied to the problems of transportation with greater satisfaction with electric vehicles than any other type. Electrical measuring instruments reveal, and record, if necessary, the condition and performance of storage batteries and electric motors. The cost of producing electricity is a known quantity. The amount of electricity necessary to charge a battery is measurable. The amount of electricity delivered to an electric motor by the battery is a known quantity, or can be measured. The performance of an electric motor is accurately specified for any conditions. Its efficiency is easily determined.

The work of moving a ton a mile per hour on a hard level road is expended in starting it from rest and in overcoming the resistance of the road, the tires, the bearings, and electrical circuits and the air. If the road is not hard or not level, of course more work will be required to overcome its resistance, or to move the load up a grade. If it is necessary to start often from rest more work must be done than for continuous motion.

The electric vehicle cannot be used profitably where it is not needed. Where the work to be done is less than half the ability of the machine, proper value may not be derived from the investment.

Where a large number of vehicles are used the advantages of electricity become more apparent and the efficiency of the service is still more improved.

Transportation by electric vehicles is a subject simple to explain and easy to demonstrate to the satisfaction of anyone interested. The selection of the proper equipment, however, depends on the engineering sense of one familiar with the problem.

For the convenience of those interested in details a table of comparative capacities and standard dimensions is given below. Similar information on performance and economies can be made available when operating conditions and cost of electric current are fully known.

ELECTRIC VEHICLE ECONOMY.

As most manufacturing companies are familiar with the horse-drawn proposition, it is of interest to compare that method with the electric, therefore it may be stated that taking into consideration depreciation, interest, insurance, stable room, shoeing, veterinary charges, harnesses, blankets, stable help and feed, on the horse side of the argument, and the corresponding items against the electric truck, including electric power at four cents per kilowatt hour, the actual economy in cost shows in favor of the electric truck by 22 to 35 per cent, according to the size and number of vehicles operated, and the surrounding conditions.

It should be recollected that the electric vehicle requires only the space it occupies. It needs no hay-loft, stalls, harness room, bedding platform or manure pit; nor does it require extra equipment to do twice the work that horses drawing the same capacity per load accomplish.

While the stable man is obliged to keep a supply of extra horses to substitute for those which are sick, disabled, or being shod, it is not necessary to have extra motor vehicles on hand as 98 per cent of all causes for delay can be provided for in advance and thus prevent or overcome lay-up for repairs.

In a small one-story storage garage, not over 25x60 feet, may be housed the complete equipment of five vehicles, which will displace and do the work of nine or ten horse-drawn trucks and eighteen to forty horses, according to the size of truck and the method of working horses. One intelligent mechanic and a helper can easily care for these machines and keep them in first-class operating order, while the drivers of the horses in a few days become proficient operators of electric trucks. Notice the economy in stable room and stable help.

While the heat of summer, the chilling rains of the fall, and the low temperature of winter, to say nothing of the glare, icy pavements and deep snow, all work havoc with the health of the horse and make the death

A Portion of the Garage of the Pacific Mills, Lawrence, Mass., Showing Five of the General Vehicle Electric Truck Fleet.

rate high, the electric truck knows no seasons, but keeps constantly at its work the year round, good and bad weather alike.

TABLE OF CAPACITIES AND DIMENSIONS OF (G. V.) ELECTRIC VEHICLES.

Carrying capacity,	1,000 lbs.	2,000 lbs.	2 tons.		3½ tons.		5 tons.	
Type of vehicle,	Delivery Wagon.	Delivery Wagon.	High Seat.	Low Seat.	High Seat.	Low Seat.	High Seat.	Low Seat.
Speed in miles per hour.	12	10	9	9	8	8	7	7
Mileage travel on one charge	45	45	45	45	40	40	35	35
Wheel base...............	81½"	102"	111½"	111½"	126"	126"	139"	139"
Gauge	55"	60"	61"	61"	65"	65"	69"	69"
Overall length...........	128"	149"	180"	166"	197"	183"	223"	209"
Overall width...........	66"	72"	76"	76"	79"	79"	81½"	81½"
Clear loading space, length*	72"	96"	137"	120"	154"	137"	180"	163"
Clear loading space, width.	41"	48"	56"	56"	60"	60"	72"	72"
Clear loading space, height.	60"	* *	72"	72"	72"	72"	72"	72"
Height of platform loaded	33½"	36"	41½"	41½"	42"	42"	42¾"	42¾"

Accustomed as most horses are to moving freight trains and cars, it is nevertheless a fact that quite often a good horse will become frightened and run away, causing loss not only to vehicle, harness and load, but frequently irreparably injuring or killing itself or running mate. These incidents all go to make the horse expensive, and form links in the chain of strong arguments for the electric truck.

Among the many arguments which should be considered in connection with electric motor work over horse-drawn trucks are, first, the cleanliness in garage and around the yards. The vehicles and the motors driving them, running on very generously proportioned ball and roller bearings, which are sealed, oil and dust tight, require oiling only once in six months, and therefore have not the dirt and hot oil throwing proclivities incidental to other forms of motor vehicles. Second, the electric method is much cheaper, requiring a less number of vehicles, therefore less drivers, and the loading or unloading crews are less, or the present force is kept busier. Third, while the current for the charging of the batteries is figured in all commercial estimates on which this argument is based at four cents per kilowatt hour, it is a fact that most mills or factories can operate a small wheel or a small engine during the night, furnishing power to charge the batteries, or taking current from the lighting plant before the peak of the load, utilizing power which would otherwise go to waste, thus reducing the cost of current to a small fraction of a cent per kilowatt hour. Fourth, the flexibility in the handling, light or heavy loads carried with equal ease, the turning of vehicle and backing to freight cars, doors or elevators, and its ability, on account of occupying only 60 per cent of the space used by the horse-drawn vehicle, flexible steering, and starting and stopping devices, to travel in congested yards or buildings. Fifth, it can be run into factory buildings, on elevators, into shipping rooms or freight houses, and on docks and wharves, all of which places are barred to the gasoline truck by insurance regulations. Sixth, and most important, the money invested in electric motor vehicle transportation will produce a larger dividend, when compared with present horse costs, than is earned in any other portion of the manufacture

With the advent of the electric motor truck for mill yard and road purposes has come a demand for a smaller form of electric truck to be used throughout mills and factories for the purposes of transporting raw materials, goods in process and finished goods through the buildings, and to assist in the loading of the outside vehicles.

For a number of years the mill and factory men, as well as all freight and baggage terminal agents, have been looking for something to take the place of hand trucks. To meet this demand a simple form of electric vehicle has been designed in a small size, and is now in use in many mills, factories, depots, freight sheds, and on steamship piers. Its clearance and radius of action permits it to pass through congested places, going forward or backward with ease and facility, and capable of ascending gradients of 20 per cent. On piers and railway terminals it can deliver its load on the deck of a vessel or within a freight car. Those who travel by the Fall River Line may, on the pier at New York, see in operation over twenty-five of these little General Vehicle electric trucks. It will prove of interest to note the system of loading from a platform of the same height as the truck platform.

In a warehouse or mill the truck can carry its load from floor to floor, wherever wanted, with a degree of celerity otherwise impossible. In the mill and factory it carries materials direct to the place where needed, and at the precise time when needed; something impossible with moving apparatus working on a fixed track. At the same time it does its work more quickly and far more economically than can be done with the use of hand trucks.

A load of 2,000 pounds has been found the limit for trucks to have the widest range of action.

The industrial truck is the simplest of all trucks electrically propelled, having from twenty to twenty-five less parts than usual. Both battery and driving mechanism are mounted below the platform, which accordingly is free and clear to carry not only a compact load, but iron pipe and similar material.

The operator drives the truck at three times the speed he would ordinarily walk when pushing or pulling a truck, and in addition is carrying two or three times the weight that he would carry on the old hand truck. He has perfect control over the truck, and can steer it around corners or

Two-Ton General Vehicle Electric Truck, Operating in a Ten-Inch Fall of Snow, at Pacific Mills, Lawrence, Mass.

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*Length given is without stakes in rear. When stakes are used on 2, 3½ and 5-ton trucks deduct 5 inches.

**Height for express body, 60 inches; for panel body, 66 inches.

stop it instantly. Standing erect on the end of the truck with hand on the controller and foot on the brake pedal, he is in the best possible position to guide and control his load. As low grade labor is used for the operation of these trucks they must be made as nearly as possible automatic. Therefore, it is mechanically arranged so that the controller returns to neutral point as soon as the hand is removed from the lever. The cut-off switch cuts off the power when the foot is removed from the brake pedal. The brake is spring-operated and sets instantly as the foot is removed from the brake pedal. It will thus be seen that should an operator jump or fall from the truck the mechanism will at once bring the truck to a standstill. In one of the large print works at Lawrence, Mass., a fleet of ten of these is used for carrying rolls of print cloth from the storehouse to the printing machines, and for the carrying of dye tubs from the color room to the machines, and the return of the empty tubs.

Two-Ton General Vehicle Truck Used for Hauling Yarn and Finishing Product Between Mills Six Miles Apart and Freight Station, by Sugden Press Bagging Co., West Chelmsford, Mass.

That the truck may be adapted to a wide range of local requirements is evidenced by machines already built to meet individual plant needs.

The industrial coal truck in the service of the Boston Manufacturing Company is only one example of what can be done to adapt the general principle of this truck to local needs. About 1,600 pounds of coal are carried per trip and the machine dumps "clean."

One of these trucks used in a plant near Montreal is equipped with a hand winch for warping on coils of wire, etc., and one now building is destined to be an efficient fire protector, as it carried fire extinguishers and other fire fighting paraphernalia.

By the introduction of these small electric trucks it has been found that a saving in labor, sometimes reaching as high as 70 per cent, has been made. This means that the original cost of the truck is soon cared for from the labor appropriation, and the little machine is thereafter a great money earner.

Just as the electric light has supplanted the candle, kerosene oil and gas, and the electric car displaced the stage coach and horse car, so will the electric truck, one of the most useful inventions of the twentieth century, most surely succeed the slow going ox and the expensive horse.

Genius has entered the motor against the quadruped, and all who have witnessed the triumphs of the inventive mind over the clumsier resources of animal strength will realize that the horse must make way for the motor; for science and engineering skill are greater than brute force, and they have produced the electric truck, which is here today as a practical, economical machine.

Model Electric Garage for Nashville

Believing that Nashville, Tenn., is one of the best electric fields in the south, Sydney W. Riddle and Eugene R. Howard, two of the city's most enterprising business men, have formed the Broadway Electric Company, and moved into handsome new quarters at 1213 Broadway.

The company will handle the Waverley electric pleasure vehicles and trucks.

In forming the new company Mr. Riddle and Mr. Howard have taken over the business of the Waverley Electric Company, formerly managed by Mr. Riddle.

The Broadway Electric Company will be open night and day, and skilled mechanics will be on hand at all times to repair cars and batteries. Electric cars of every kind will be taken care of, regardless of make. The building, which the company now occupies has been especially constructed for its business, and it will be the only garage in the city, it is said, which has no posts. This will make it an easy matter to turn the machines around inside the building.

The company will be prepared to do anything necessary for the maintenance of electric cars, even to the extent of rebuilding batteries.

Another feature of the garage is a rest room for ladies, which will be handsomely fitted up.

Mr. Riddle has just returned from a trip to Chicago, Louisville, and other middle western cities, as well as points in the East, where he made a thorough investigation of the electric garages, noting the best features in the different garages in order to make up a system especially adapted to Nashvillians. The garage will be one of the finest and best equipped in the south.

A formal public opening was held during the week of October 7. At this opening there was on display one of each of the models made by the Waverley company.

Mr. Riddle has been in the automobile business in Nashville for some time. He is a graduate of Vanderbilt University, and of Princeton University, and is widely known throughout the state.

Mr. Howard has been in the automobile business for six years, and for three years has been manager of the auto department of Deeds & Hirsig.

Prospects for a large business are bright.

"The slightest dampness of the pasteboard covers of dry cells will more or less short circuit and run down the amperage," states Penrose Reed, sales manager of the Chicago Electric Car Company. "Stockings made out of short sections of old inner tubes make good covers for dry cells."

The Federal Road Building Policy

An Address Before the Good Roads Convention at Detroit

BY DAVID F. HOUSTON

THE suggestion of great national transcontinental roads appeals to my imagination, as does the suggestion of inter-state roads connecting capitals or cities of commercial importance to my logical faculty and to the sense of pleasure that I experience in riding about the country in my friends' automobiles. But that the essential thing to be done is the providing of good roads which shall get products from the community farms to the nearest station and make rural life more profitable, comfortable and pleasureable, I entertain no sort of doubt; and it is obvious that the representatives of the people in Congress are like minded. For in making their appropriation they stipulated that it should be used in improving the condition of post roads with a view to the economy and efficiency of postal delivery and for the transportation of farm products to the market. Such roads are equally essential to the establishment and operation of decent elementary and secondary schools for the benefit of the country boys and girls. I do not eliminate other things for consideration and I do not underestimate the rights and pleasures of the automobilists and the service they have rendered in the propaganda for road building all over the country.

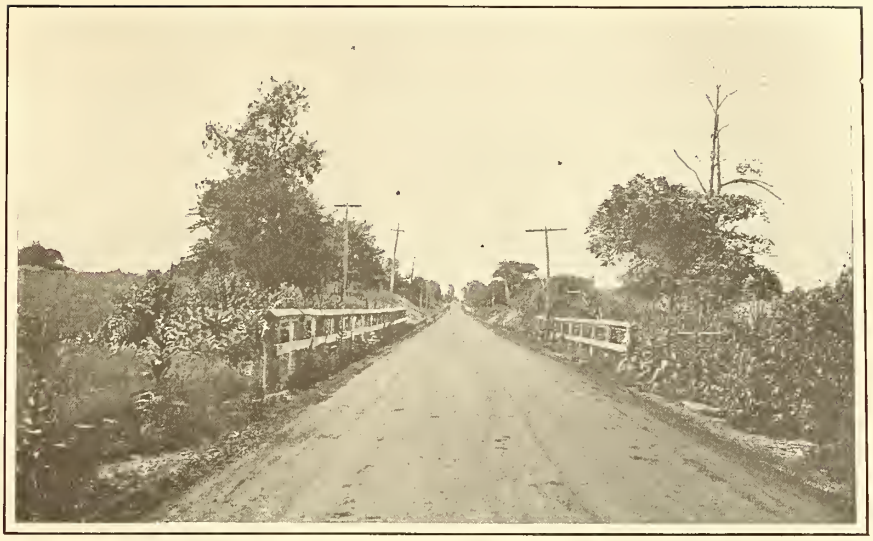
Fourteen-Year-Old Oiled Macadam Road.

There are complex problems to be solved in many states before the most efficient expenditure of money by states and communities for roads can be secured, and there are many more to be worked out before one can rationally expect the federal government largely to participate. Who shall say how aid should be apportioned so that the states may receive equitable treatment? Shall it be apportioned equally among the states on the basis of total population, farm population, area, taxable valuation, road mileage, or all these; and should federal money be expended exclusively through its own agencies for a certain system? What roads are to be improved? There are approximately two and a quarter million miles of publicly owned roads in the nation. Half of this mileage is utilized for post roads and less than ten per cent of the total can be classed as improved in any large sense. Shall we undertake to apply aid to all the roads or shall we consider this a task too gigantic? Shall we apply it to the rural routes or shall we regard this as equally beyond reason? Or shall we single out certain directions in which central roads shall run, and if so how? Is it not clear that this opens up a field where petty politics, community interest and individual selfishness may run riot? Assuming that we have settled this, for what purpose shall the aid be granted and in what proportion? Shall it be exclusvely for construction, exclusively for maintenance, or for both? Shall it be to pay the entire cost of either or both of these items, or shall it be dependent on the equal or larger contribution by the states and communities? Shall the aid come through votes of money out of the treasury or from the sale of bonds?

A Road Problem: Snow and Ice Fill the Ditches, and Water Escapes Down the Middle of the Road.

That the suggestion of federal aid to road building raises grave questions and involves possible dangers, no thoughtful citizen doubts. There are proposals bfore the public mind which would bankrupt the federal treasury and suggest possible abuses before which those of the worst pork-barrel bills of the past would pale into insignificance. No proposal which does not carry with it the assurance of safeguarding the treasury in this direction seems to me to stand the ghost of a chance of favorable consideration. It is not alone the fear that there would be no stopping place. There is the question of precedent. This is not the only proposal bfore the American Congress involving the suggestion of huge appropriations. There are others which, to their advocates, are just as important and are being just as insistently urged; and many of the veteran congressmen have naturally contracted the habit of balking automatically at such proposals.

It would be especial pernicious if such aid should result in stifling the spirit of local self help. In this field as in others, the states have recently made great headway, and any action taken should unquestionably result in the fostering of this spirit and in the efficient direction of the activities to which it may lead.


Road from New Haven to New York, Sprinkled with Oil Once a Season,

Another difficulty to be avoided is the over-centralization of activity in these intimate internal matters and the building up of a great and powerful bureau in Washington, with an ever-increasing control over the highways of the country. The dictates of prudence and experience are that so far as possible such agencies as may be required should be efficiently developed in the several states and that the federal agencies should work in a spirit of complete and helpful co-operation and assistance.

The first practical essentials in the planning of road legislation would seem to be to recognize the states as the smallest unit with which the federal government might deal. This would give relief in a measure from the insistent demand that would come from every township and every district in the Union for its share of state or federal assistance, without reference to the merits of the case or the practicability of the undertaking. As has been stated, many of the states now have efficient state highway departments, and thus afford organized agencies with which the federal office could deal. It would seem that the basic feature would be such co-operation between the states and the federal government as would leave with the states the initiative in the selection of roads to receive aid, and as much of the immediate construction and maintenance as would be practicable. In the case of roads on which federal money is to be expended it would seem essential and wise that the federal agency should have the requisite power of the approval of the selection, supervision of the construction and maintenance, and the right of inspection, for the plain and simple ordinary purpose of seeing that the federal money is applied to the purpose for which it was voted and is efficiently expended.

Limestone Macadam Road at Cannonsburg, Pa.—Built in 1900; Disintegrated.

It is reasonably clear that for every reason there must be some automatic check upon the demand to be made upon Congress and that this should be afforded through the requirement that the states and the localities should contribute an amount both for construction and maintenance at least equal to and possibly double that contributed by the federal government; and that, in the apportionment of any possible federal funds a number of basic factors such as population, area, wealth, or minimum cost of construction, should control, I have not the least doubt.

There may be those who "will view with alarm" any suggestion that the federal government co-operate with the states financially in road building and more especially that it exercise an adequate measure of control and supervision even over the expenditure of its own funds. The cry of centralization—that the federal government aims unduly to extend its powers may again be raised. Yet, in a field of common interest and of inseparable activities what could be more natural than co-operation and mutual assistance? Why should the two jurisdictions serving the same people forever stand apart and view each other with suspicion and distrust while nothing is done or much is wasted? And is it not worthy of note that the alarm never seizes such people at the stage of the discussion in which it would be of most value? They are not in the least timid in their approaches to the federal treasury and their courage fails them only when it is suggested that the federal government has a right to see that the money of the people of the nation is wisely and efficiently expended. If they are to take counsel of their alarms let them do so before they determine to assault the treasury. In short, as a practical program, I believe that this matter is one in which haste can best be slowly made. The people will sanction a reasonable expenditure of their money—and it is their money and theirs only, whether it be expended through the federal government or the state—when they are convinced that it is applied to a wise purpose and will yield the results anticipated. And I am impressed by the wisdom of the action of Congress, in the midst of so much clamor, in constituting a committee "to make inquiry into the subject of federal aid in the construction of post roads," in providing an appropriation of a half million dollars to be expended co-operatively with the states in the proportion of one to two, and in requiring the secretary of agriculture and the postmaster general to report to Congress the results of such expenditure "together with such recommendations as shall seem wise for providing a general plan of national aid for the improvement of postal roads in co-operation with the states and counties, and to bring about as nearly as possible such co-operation among the various states as will ensure uniform and equitable interstate highway regulations." This indicates a wholesale desire to know the facts as well as a generous interest. Too short a time has elapsed to judge of the value of this undertaking, but that it is in the right direction few will question. That it might be extended with ample funds if aid is to be furnished most thoughtful men would concede; and the plan has the peculiar value of being susceptible of indefinite extension in case the results should be found to justify it.

Tire Injuries and Suggestions for Greater Mileage

By L. Greenwald, manager service department, the Firestone Tire & Rubber Company.

It may be interesting to mention some of the most frequent tire injuries that come to our notice.

Small ruptures in the fabric may develop from a small cut through the cover or a severe bruise by a sharp stone or other object. The blowout quite often does not occur until sometime afterwards. The inner tube may become larger from the continued strain, eventually giving way.

Running in street car tracks breaks the fabric on the inside. If there is a ragged edge on the flange of the rail the rubber cover will also be damaged.

The fabric on the inside of the tire may be bruised, chafed and broken from the rim bumping it when the tire is soft and driven over rough places.

Small peculiar zig-zag breaks in the fabric circumferentially appear when the tires are too small for the load and taxed beyond their carrying capacity.

If the rubber on the side-wall has been cut up and worn from rough, rutty roads, reverse the tires; *i. e.*, turn the worn side of the tire toward the car. If equipped with cemented flap, the flap should, of course, be reversed also.

New macadam roads, especially when wet, are severe on the rubber cover. A cut in the cover of case when that part of the tire is under the weight of the machine and in contact with the road, has a tendency to expand, owing to the elasticity of the rubber, and invites dust, grit, pebbles and other foreign matter; or rather, the foreign matter forces itself into the cut. With the revolution of the wheel and when the injured part is relieved of the weight of the car, this foreign matter which has accumulated (and with each succeeding revolution of the wheel) acts as a wedge and further forces itself between the cover and the fabric; consequently, if neglected, a complete separation of the tread will result. The fabric absorbs moisture into itself, destroying the adhesive friction, causing decay and blowout.

Excessive wear to the tread may be attributed to the wheel not traveling in alignment due to a bent axle, loose steering knuckle, steering rods that are either too short or too long. Examine the brake bands and see that they are working properly. If they are tight the rear tires may be affected. If the wheels are in perfect alignment but too much out of perpendicular, there is a binding action at the axle and the tires have a tendency to drag instead of rolling over the ground freely as they should.

If the rear wheels lose traction and spin in the sand, the cover may receive numerous small cuts.

Do not start the car quickly and avoid severe application of the brakes—there is an abnormal strain to the fabric of the tire.

If any oil or grease should work into the tires from the gear case or brake drum, this accumulation should be removed—grease is a solvent of rubber and its effects are very harmful.

When laying up the car for any great length of time, as for winter, the tires should be partially deflated and the weight of the car supported by blocks or jacks.

Beauty of Electrics

"An electric car must essentially possess those qualities of beauty and luxuriousness which appeal to the discriminating taste of the woman," says G. A. Pearson, treasurer of the McDuffee Automobile Company, Chicago, dealer for the Rauch & Lang electric. "The woman plays such a prominent part in the purchase of electric cars that she must be given more than average consideration in its manufacture.

"The electric car must possess more than mere beauty—more than mere harmony of line—more than a well-tailored inside—more than pretty and wearable upholstery and more than exquisite appointments. It must have that something that is indefinable—that something which the salon prize winning artist puts in the picture, yet which the layman cannot describe. It affects him in many ways—probably its impressiveness—the combination of colors—the subject—or the method in which the subject has been treated. The fact that it has impressed him is sufficient reason for his giving it consideration.

Service Organization

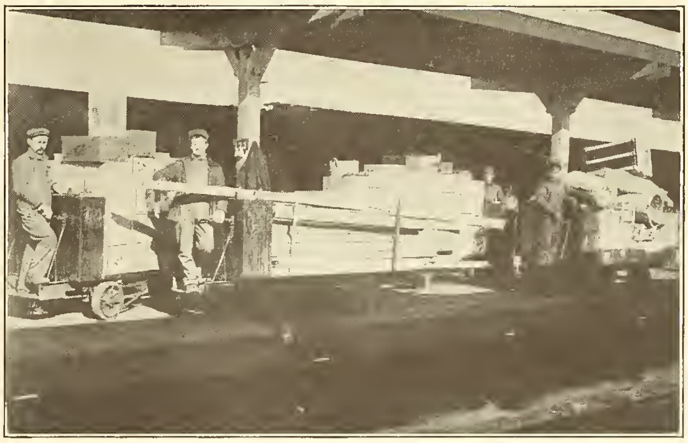
Automobile service organizations are playing a very important part in the sale of automobiles these days. The extra attentions that are accorded purchasers of cars, free from any cost, says when a minor charge is made in extraordinary cases, comes as a boon to the auto enthusiast. The McDuffee Company of Chicago, which handles the Rauch & Lang electric, has developed a big and flourishing business which is attributed to such a service department. The McDuffee people have arranged to give their service in a combined form granting all the features of their service to the buyers of electric cars.

Little Trucks for Local Work

Adapting the Electric to the Transportation Problems of Dock and Warehouse

BY PERRY J. HOLMES

THE supremacy of electric freight trucks over hand trucks is an acknowledged fact by freight-handling experts. This conclusion has been reached after rigid tests have been made, covering a period of several years. The trucks are designed for the special purpose of handling freight at railway and steamship terminals, freight-houses, manufacturing plants, foundries, mills, wholesale establishments, warehouses and all other institutions requiring trucking about the premises.

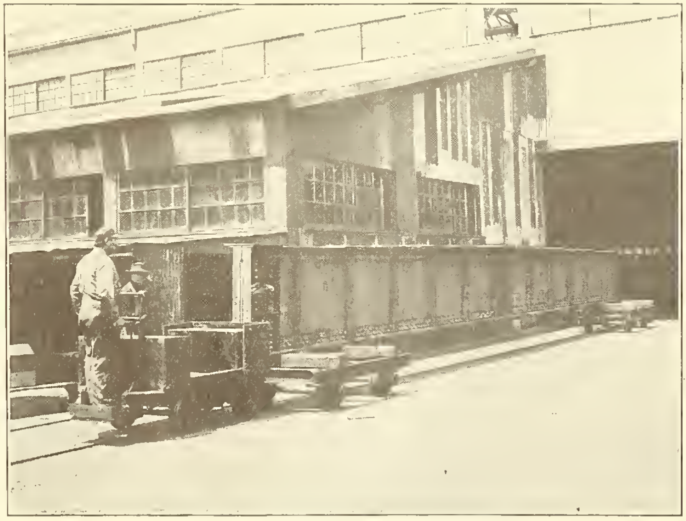


Trucks Employed in Handling Freight at Railroad Depots.

These trucks meet the present conditions found at railway and steamship stations, and are equally efficient in handling baggage, mail and express matter in and about pessenger stations, thereby making the expensive changes of platforms and other equipment unnecessary. The operation is simple; they may be operated with equal efficiency forward and backward by unskilled labor. Wherever they have been installed, it is claimed an actual saving in wages of 25 to 50 per cent has been effected over the old method of hand trucking.

Easily controlled, the trucks may be readily turned in a small space. The power for operating is supplied by storage batteries, conveniently located so that they may receive proper attention without delay or trouble. One charge of electricity is sufficient to do a day's work under normal conditions. The trucks are very powerful, and when loaded will negotiate grades of from 15 to 25 per cent with ease, will cover a distance in one-quarter the time and handle about six times as much freight as hand-operated trucks, and do their work quickly and efficiently.

One end of the truck contains the storage batteries. To the other end, as shown in illustrations, is attached a movable end-gate. This gate may be lowered to a horizontal position, thus increasing by three feet the available loading platform. The gate may also be lowered to the floor and used as a skid in loading or unloading the truck and can be removed when not in use. These are special patented features, by the use of which an additional saving of several cents per ton is frequently made in handling freight.



Type of Tractor Used in Steel Mills.

Another pronounced advantage is the fact that the platform and batteries are mounted on spiral springs, which carry the load smoothly and reduce the possibility of breakage to a minimum.

The construction of the truck frame in the type manufactured by the Automatic Transportation Company consists of two steel channel sections, which extend the entire length of the platform, and which converge slightly into a reversed bend just back of the leading or steering wheels. The frame is supported on four spiral springs, each of which is encased within a malleable iron box and transfer the weights of lading directly to the axles.

The pinion of the motor, which through a Morse silent chain engages a sprocket wheel about four times the former's diameter, and which contains a substantial and compact differential, transmits the mechanical energy through a jack shaft supported under the two frame members by roller bearings to two side chain drivers, giving a gear ratio with the driving wheel of 12 to 1. This form of drive allows speed changes in 5 variations of from 1 to 10 miles per hour in either direction for freight and baggage trucks, and 3 variations of from 1 to 5½ miles per hour in either direction for industrial trucks.

Much attention has been given to the axles, which are rigid under the frame, and at their outer extremities run in a double set of Standard annular roller bearings which are mounted in solid ribbed cast wheel center around which are secured solid rubber or fabric tires, making a wheel of 16 inches in diameter. The steering is done by means of a lever conveniently arranged, which moves in a vertical plane. The direction of the wheel is changed in the same manner as in all standard makes of automobiles, the axle itself being immovable.

The controller and circuit breaker are specially designed for the trucks, and have proven so efficient as to eliminate the arcing and all dangers found in operating other electrical vehicles. These trucks may be operated without the slightest danger from fire. The current cannot be applied to the controller without first releasing the brake, which automatically closes the circuit switch, at which time the controller will convey the current from the batteries to the motor. The moment the current is cut off, the brake will set automatically and remain set until the circuit breaker is again closed, at which time the band brake is automatically released.

The motor is 2 horse power and designed especially for this service, having a high starting torque and exceptionally high efficiency, and is series wound for 24 and 48 volts. The armature is carried on Hess-Bright annular ball bearings, and has a capacity sufficient to handle a loaded truck up a 15 to 25 per cent grade.

The power for operation is derived from a specially designed National storage battery of ample capacity located in a steel receptacle on the driving end of the truck. Edison batteries may be installed when specified. The power is taken from the batteries through a maximum capacity fuse and a circuit breaker drum-type controller, the latter being mounted between the two frame bars, and is connected to a set of resistances which is operated by a lever moving in a vertical plane, giving 5 speeds forward and 5 reverse on freight trucks, and 3 forward and 3 reverse for industrial trucks. The power cannot be sent into the controller until the foot pedal has been pushed down by the operator, which simultaneously releases the band break on the jack shaft and closes the circuit breaker. The controller releases the amount of current sent into the motor through resistances which are placed between the controller and the jack shaft. From the controller the power is conducted through insulated wires to a two-horse power motor which is also mounted between the frame bars just behind the leading axle.

Industrial Truck Employed in Handling Cotton at the Wharves.

Probably one of the greatest advantages of the electric power truck is due to its ability in handling successfully the baggage problem which confronts every railroad. The trucks designed for this particular end of the industry are so constructed that they may be operated from either end, and also they contain a double platform which has proven a great success because it affords a double loading space.

The electric power truck has found its way into the recesses of the factory and the warehouse. Special attention has been given to the building of a truck that will meet the requirements necessary in the successful handling of material where space is usually crowded. The industrial truck is light and very flexible, and on account of its size, may be operated in narrow aisles and run into elevators and conveyed from floor to floor.

Factory developments have progressed to such an extent that the manufacturers of the freight truck have realized the demand for a tractor. It is claimed that one tractor will do the work of several mules or of from four to eight men. The tractor does not operate on rails and may be used wherever required in and about a factory.

In iron and steel mills, and in fact in any place where trucking is now being done with four-wheeled trucks, the tractor is included as one of the most important elements in obtaining quick and efficient service.

The results which have been brought about by the use of the storage battery propelled freight truck have convinced the present owners that this type of electric vehicle is a pronounced success. The developments in this field point plainly to the success of the storage battery era, which is rapidly convincing users of the advantages of the battery propelled vehicle.

The Big Fleets Are Electrics

"The electric truck is as yet rather in the minority when it comes to production, but statistics of production do not tell quite all the story," says Carl Metzger of the Metzger-Herrington Company, distributers of Argo electrics.

"If you have ever noticed it, the big fleets of the country are electrics, and the majority of all motor installations are electrics. Those who have given up all horses seem to favor the battery driven vehicle. I wonder why?

"The bicycle had its cycle of popularity and was succeeded by the automobile. Touring became the rage, and high speed cars were regarded as essential. The rapid growth of the gasoline pleasure car industry dwarfed the electric vehicle, both pleasure and commercial. The poor old electric truck was left behind to ponder as it were, on the number and variety of its shortcomings. But—this did it good. Gave its sponsors leisure to develop a real road transportation machine—a strictly business vehicle, conforming to economic law—and so, slowly but surely, demonstrating its efficiency over that time-honored industrial unit—the horse."

Edna Hibbard Enjoys Her Electric

Edna Hibbard, who is winning applause at Cohan's Grand opera-house, Chicago, as the successor to Vivian Martin in "Stop Thief," is an ardent advocate of "electrics for women." Miss Hibbard last week was rushed to Chicago from New York. Her notification came so suddenly that it was impossible for her to bring her car—a Detroit electric—with her. Therefore until Friday afternoon, when the car arrived by express, Miss Hibbard was disconsolate.

"I intend now," said Miss Hibbard, "to thoroughly enjoy Chicago. With my dainty electric I shall explore Chicago's magnificent boulevard and park system. When I am without my car I feel utterly lost.

Recording Speed and Mileage

Automatic Instruments for Keeping Track of the Amount of Work Done

BY CHARLES P. COTTER

THE installation of the truck in business routine has produced a more efficient method of marketing goods. Just how much the increase in savings has amounted to can be determined only by figures as preserved by the truck owners. However, a great many business men have neglected to establish a proper method of computing the actual working capacity of their machines. It is hard to impress the owner of an electric carriage or truck the advantages of an accurate check on the daily cost of operating their vehicles. As long as the vehicle performs its work successfully, the owner feels at ease; still the element of cost is worthy of much attention.

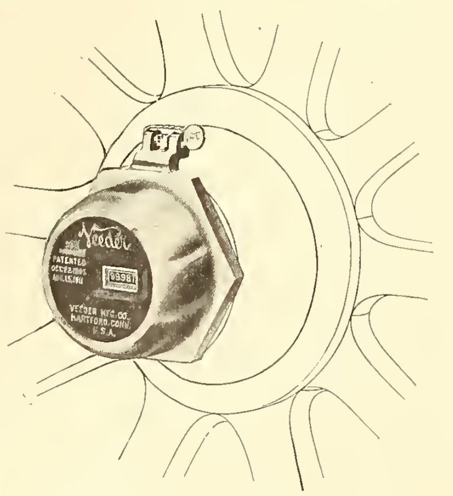

Veeder
PATENTED
VEEDER MFG. CO.
HARTFORD, CONN.
U.S.A.

Fig. 1. The Veeder Odometer Installed.

If the owner of an electric truck realized that the average car cost per mile on a 2,000 lb. wagon was .0214, that on a two-ton truck it cost .0305 worth of rubber to run his vehicle a mile, if he had a five-ton truck and knew that with the most efficient handling of his truck the entire cost should be only .0859 per mile, then it would seem he would be most anxious to check up his precise car cost, and know whether his drivers were giving him the best of service, and whether they deserved an increase or a reduction in wages.

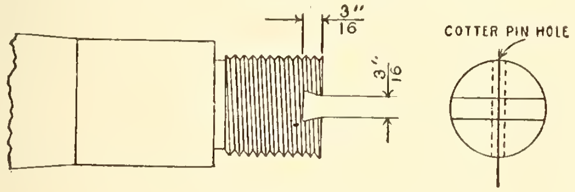


Fig. 2. Slotted Spindle for Odometer.

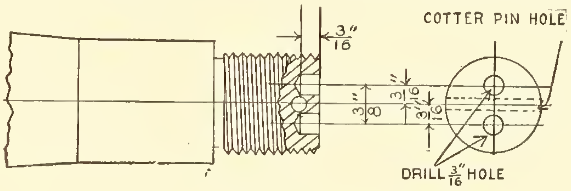


Fig. 3. Drilled Spindle for Odometer.

It is the same with the consumption of current. If the owner knew what the most efficient handling of his truck should mean in miles, and the charge of batteries, then he should be most desirous to have an absolutely accurate instrument by which he could get at what these things will cost him. It is a very broad and important subject, and yet it is a matter which a great many business men have failed to consider.

The value of checking the performance of a mechanical transporting service is an important figure in ascertaining the expense of delivery. Having a true record of the mileage, the cost a ton mile in mileage obtainable from a battery charge can easily be determined.

For the purpose of ascertaining these facts accurately, figures which are constantly in demand by business men, the Veeder Manufacturing Company, Hartford, Conn., has placed on the market an odometer, which is a positive mileage recorder. It registers the distance traveled backward as well as forward. This prevents any one subtracting mileage by running the wheel backward. It is arranged to be sealed onto the hub in place of the regular hub cap, as shown in Fig. 1, and cannot be taken off without the owner's knowledge. There is no way to disconnect it by slipping gears out of mesh. Hence, the odometer gives a true record of the mileage, and makes it possible to figure an exact mileage cost. A simple mechanism inside the cap drives the register always in the same direction, so that the entire distance traveled by the car, whether forward or backward is recorded. There is no way to take the instrument off, except by unscrewing it from the hub. This can only be done after the set-screw has been withdrawn sufficiently to allow the cap to be turned, and this cannot be done without breaking the seal. The seal shown in Fig. 1 is the same as has been used for many years by the railroads, and absolutely prevents tampering without the owner's knowledge. The instrument may be attached to either the left or right front hub. The left wheel is recommended, because it is less apt to be hit by the curb, post, etc. It can be used on any wheel having a dead axle.

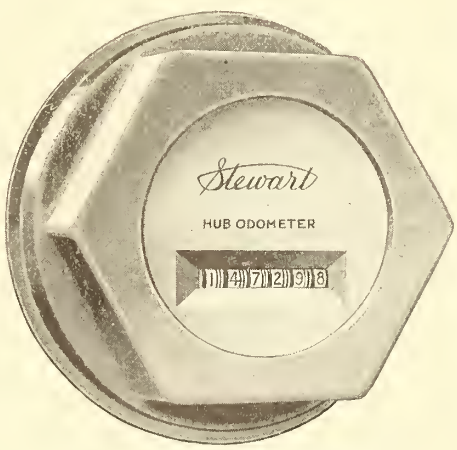


Fig. 4. Stewart-Warner Speedometer.

To attach the odometer, it is merely necessary to saw a slot, or drill two small holes (see Figs. 2 and 3) in the end of the spindle, and screw the odometer on to the hub. When it is in its proper place a hole can be drilled in the hub for the point of the screw. With set-screw replaced and turned into the hole until its head comes in line with the holes in the two ears, a thin wire can then be inserted and compressed. A short wire is used for the steel. If no steel be used a split pin or wire can be put through screws in the ears to prevent the set-screw from shaking out.

The Stewart-Warner Speedometer Corporation, Chicago, is manufacturing a new hub odometer, which is designed particularly for commercial vehicle service, but adapted to any make of electric car. Enclosed in a cylindrical casing, it is attached to the hub of the machine and is provided with a flat dial with numbers showing in a slight recess (Fig. 4). Capable of registering 100,000 miles for the season, the mileage is shown by large numerals in black on a white background. The instrument is so constructed that it can show fractions of a mile in tenths. The drive is positive to a steel pinion, each pinion machined from a solid piece of high-grade steel, carefully heat-treated, and hardened to resist wear and usage. This odometer has the Geneva stop mechanism, which locks the dials, excepting the instrument of registering, and those not moving remain locked, a construction making for accuracy. Absolutely springless, there are no pauses or rests—nothing to get out of order. The speedometer is a real necessity for trucks and other electric vehicles. It is an accurate, reliable register of the exact mileage. It is the only check on the efficiency of the truck, or car. It is the only positive method by which one can get the exact cost of his delivery system.

Novelties in Charging

Charging your electric car at home is not only a great convenience but a greater economy.

Wotton Rectifier.

The plump little machine shown in the illustration can stand in a space eighteen inches wide in the private garage. The car is put on charge by throwing one simple switch.

No matter whether you have "current that fluctuates," "line drops," "cessation of the current," or any other abnormal condition, this rectifier starts and stops and charges and stays on the job until the battery is full charged and then automatically stops.

One simple switch controls the full convenience of charging, automatic starting, automatic stopping.

Sometimes batteries require a "soaking" or overcharge to overcome sulphation. The "Soakometer" does this automatically. For every day charging the Soakometer cuts off the charge as soon as the battery is full. Once every week the charge is automatically prolonged just enough to break down this sulphation.

The battery is the war chest of the electric car. To protect that battery so as to get the most life and the greatest mileage, it must be properly charged.

The Wotton rectifier, soakometer equipped, insures this advantage. This patented panel has had great success.

Service is another assêt gained. Wherever a Wotton panel is sold, the company's service follows. The devices are marketed by Wotton, Cleveland, Ohio.

The Merchants Heat & Light Company, Indianapolis, is charging 250 electric vehicles and all of its trucking is being done by electric vehicles.

Lincoln Highway Route Practically Settled

Information has been brought to Detroit by Henry B. Joy, president; Carl G. Fisher and A. R. Pardington, vice-presidents of the Lincoln Highway Association, to the effect that plans for the great transcontinental route were practically settled at the conference of governors held at Colorado Springs.

An official statement has been issued to the thousands of subscribers to the $10,000,000 fund now being raised, which reads as follows:

The maps and plans presented by us and others showed an unanimity of opinion extraordinary in seeking to solve the problem of an ocean to ocean highway.

We regret that we cannot as yet give details of the proposed route of this most practical memorial to the martyred Lincoln. We are, however, pleased to state that if our negotiations in regard to some of the Eastern possible sections of the route are as entirely satisfactory as our conference with the governors, I hope we may get the whole field covered in the near future. We are after some Pennsylvania and Ohio information and await some details from the Middle West before it is possible to make any statement that might not be prejudicial and disturbing.

The whole country is ablaze with enthusiasm for this main artery of travel, but the pressure from some states and sections to divert it from the straightest, shortest course have rendered some of our negotiations rather delicate and strenuous.

From the broad-minded view which has been taken by the communities as a whole, after the logic of the situation carried the straight road idea to adoption, there is no doubt that the route will receive absolutely unanimous sanction from Maine to California, and from Canada to our southern borders, for all are practically equally interested in its consummation.

Contributors to this Memorial Highway come from the most widely separate courses. As an illustration, from Florida, Vancouver, B. C., and Maine cash contributions came in one mail for our $5 contributors' certificates and one of them was for $1,000. Pledges received towards the fund show that patriotic support is nationwide. The work of the states is going to be of the most patriotic character.

Some of the states are more able than others to suitably, according to their tastes, establish the Lincoln Highway. Our funds will be devoted intelligently to the work. In some sections where population is scarce, we must bear a greater burden. In no case will aid be given except for a permanently constructed highway according to our standard specifications, and an absolute agreement as to permanent maintenance so far as that is possible. It is a main point in our negotiations.

This highway now exists, but no one has painstakingly studied the possibilities of selecting and hitching together state work and county work from New York to San Francisco. Indeed I believe that before such a substantial nucleus as Mr. Fisher of Indianapolis created, it could not have been done. But added to his work came the incorporation of the Lincoln Highway Association here in Detroit, and the financial support of contributors to the work; in addition, the people of the various states themselves have reached their present state of good roads advocacy, without all of which it could not have been worked out at all.

We do not take any particular credit to ourselves or to our Lincoln Highway Association. Our association has national development of the public's appreciation of what good roads mean.

If the roads are dry from Detroit to San Francisco, for instance, the worst roads a tourist will encounter are from Detroit to the stone roads of Indiana near Elkhart. Travel from Detroit directly south to Toledo to intersect the good roads system of Ohio is impossible. There is no real road as yet from Detroit to Ohio points, but work is progressing.

The same condition exists in every state today, and it has been the study of these conditions and the linking together of road plans in different states and various counties all across the country, and drawing into one bird'seye view all the work of all the highway promoting associations, also a study of the topographical conditions that the Lincoln Memorial Highway has become an actuality.

No one can foretell the future; as to the past, the Appian Way is better known today than it was 2,000 years ago. The highways built by the great Napoleon 100 years ago are attracting to Europe millions of people to ride over them and incidentally to spend millions of dollars in Europe.

Methods for Gauging Efficient Truck Service

Speeding Up the Establishment to Meet the Electric's Efficiency

BY W. K. CHILCOTT

AFTER replacing a horse delivery or haulage system by a motor vehicle installation, some business houses have found that they did not make the saving, or accomplish the results which they counted upon. In a good many instances, the cases of this kind have been investigated by practical transportation men at the request of the motor truck owners, and in almost all of them it has developed that the reason for the unsatisfactory service of the motor vehicles, from the standpoint of earning capacity, was not inherent in the trucks, but rather in the methods which surrounded their use. In other words, the handling of the merchandise oftentimes before it was ever loaded on the truck had not been speeded up or changed to conform with those characteristics of endurance and rapid motion which should be taken full advantage of in the use of either one motor truck or a fleet.

The motor truck needs no periods of rest. It is simply a machine which can be worked at all times to full capacity, and the work of a truck must be carefully planned with this in mind. Big earnings are secured from motor trucks only when they are kept constantly at work, carrying as near as possible full capacity loads.

Delays must be eliminated at the loading platform. If the old methods of handling merchandise have made customary the loading of a machine slowly, piece by piece, some method should be devised for loading small packages before the machines ever back up to the shipping platform. When this is done the motor truck investment is not standing idle, and the truck may be worked in a way which will produce greatest satisfaction and maximum earnings.

Indicating how this problem is solved by one big user of motor trucks, the following illustration is given: A large wholesale grocery house has devised a unique scheme which avoids all delay at the shipping platform. This concern operates ten vehicles, and the plan of rapid loading has increased the earning power of the fleet fully 30 per cent.

Sectional half bodies of equal size are employed. These box-like sections are fitted with small wheels so that they may be trundled about on the various warehouse floors. Overhead on each of the floors are trolley beams running to and connecting with similar beams on a large elevator. After the half bodies have been loaded with various goods for delivery on the warehouse floors, they are suspended on an electric trolley which runs on the overhead beams. From positions on the different floors, the bodies are carried to the elevator, lowered to the ground floor and run out on the shipping platform.

There they await the return of an empty motor truck, to which they are quickly applied, two half-bodies making a full truck load. By this plan, it is plain that all loading and routing is done within the warehouse and the entire working day of the motor trucks is employed in actual delivery operations.

It is possible to devise labor and time-saving devices, such as this, for almost every kind of business and the owner of motor trucks, looking to secure the greatest profit from his machines, can profit by considering his own methods and determining whether any time-saving improvement can be brought about.

G. M. C. Trucks Used by Carson Pirie Scott Company.

A G. M. C. Truck in the Service of the Western News Company.

Another important factor, which figures prominently in obtaining the best possible service from a truck, is the efforts exercised by the driver.

It is the contention of many motor truck owners that the driver can practically make or break the successful performance of a motor truck. He is a big factor in the financial showing of almost any commercial vehicle. If a driver is intelligent and careful, both in the matter of loading a truck and in driving, the machine, if properly applied to the service, will make money for the owner. If on the other hand the truck is recklessly operated, overloaded and overspeeded, disastrous results are sure to follow. Broad experience with our own trucks, and the many machines of owners which are under our direction, has shown that the selection of a driver is a matter of utmost importance. Purchasers of new trucks often ask our advice in this connection, and we usually recommend that if the driver of their horse-drawn vehicle is a reliable man, and fully acquainted with their business, he is exactly the man to choose for a driver, providing he is willing to learn and has the intelligence to grasp the comparatively simple details of power wagon manipulation.

The former horse driver makes a better motor truck driver than the ordinary chauffeur as he understands the handling of merchandise and is familiar with the particular business in which the truck is going to be employed. Each line of delivery has innumerable peculiarities of its own. Each class of goods requires a different experience for its best and most efficient handling. It has been our experience that drivers who have been in the employ of a firm for years are usually anxious to learn to operate motor vehicles and owners find that their years of experience and their knowledge of the business is an asset which cannot be gained in a short time. Learning to operate a motor truck, however, can be acquired in a very short time, as long as the driver does nothing but drive, and is able to call on a service station for the necessary mechanical inspections and assistants in keeping his machine in first-class shape.

One method of increasing the efficiency of drivers is to place the man on a bonus system of remuneration. This system contemplates first, the hiring of good men at a good wage and offering cash rewards for good driving, freedom from trouble on the roads, and so forth. Some Detroit owners have a regular system by which credits or demerits are given to their drivers based on freedom from accidents, promptness in the morning, appearance of vehicles, attention to oiling and grease cups or other duties which may be assigned. This system works out both to the advantage of the drivers and the owner. A good driver earns more than he does working on the other basis, and the owner saves money too, through reduced bills for operation. A good driver working on the bonus system can save an owner a large amount every month, and not only this, but the service to customers is greatly improved with undoubted financial benefits to a company's business.

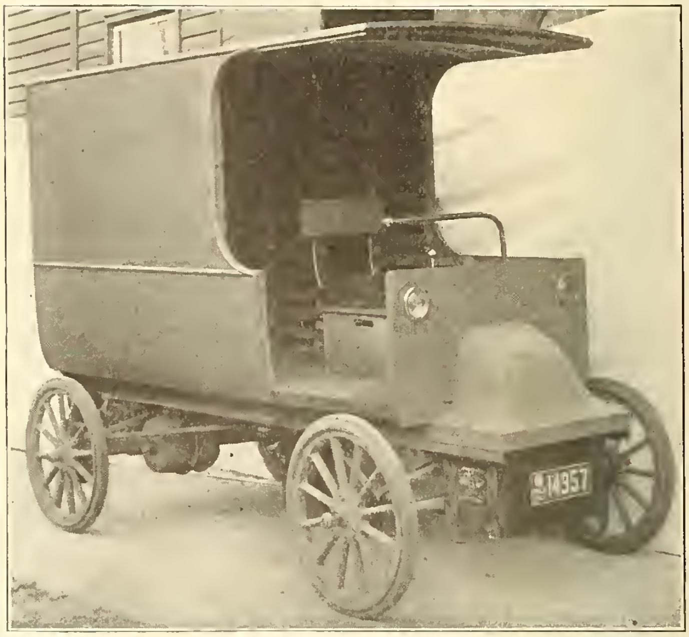
Van Auken Truck for Delivery Service

The Rauch & Lang Company is distributors for a new seven hundred and fifty pound truck, which is known as the Van Auken electric wagon. A unique feature of this truck is the division of the battery into two parts, with one set of eight cells carried beneath the front frame, and the other set of eight cells suspended on the rear frame. The battery arrangement is especially worth mentioning, because of the ease with which the batteries may be removed or replaced.

The entire length measures nine feet six inches, and it may be turned in a circle thirty feet in diameter. The vehicle has a wheelbase of eighty inches, and the loading platform enclosed in the body is ninety-six inches. In the open express body the wheel base is one hundred and ten inches. In both trucks the width is the same, forty-one inches. The platform in these trucks is twenty-eight inches from the ground, when the truck is fully loaded.

The truck with the closed body is 1,640 pounds in weight; with the open body, 1,490 pounds. It is claimed that sixty per cent of the load is carried at the rear. The battery is made up of sixteen cells M. V. Hycap Exide battery. The manufacturer claims that forty to fifty miles can be obtained from a single charge, with an average speed of twelve miles per hour.

This truck is steered from the left by a lever instead of by wheel. A continuous torque type motor is used, the motor and controller being placed close together, thereby shortening the leads. A rotary type controller is used. There is but one seat in the panel body type, an open space being left at the right for access to the load carrying the platform.


The Van Auken 750-Pound Truck.

The Van Auken truck has a great many characteristics which are adaptable for the particular service of delivering articles on short trips, rapidly.

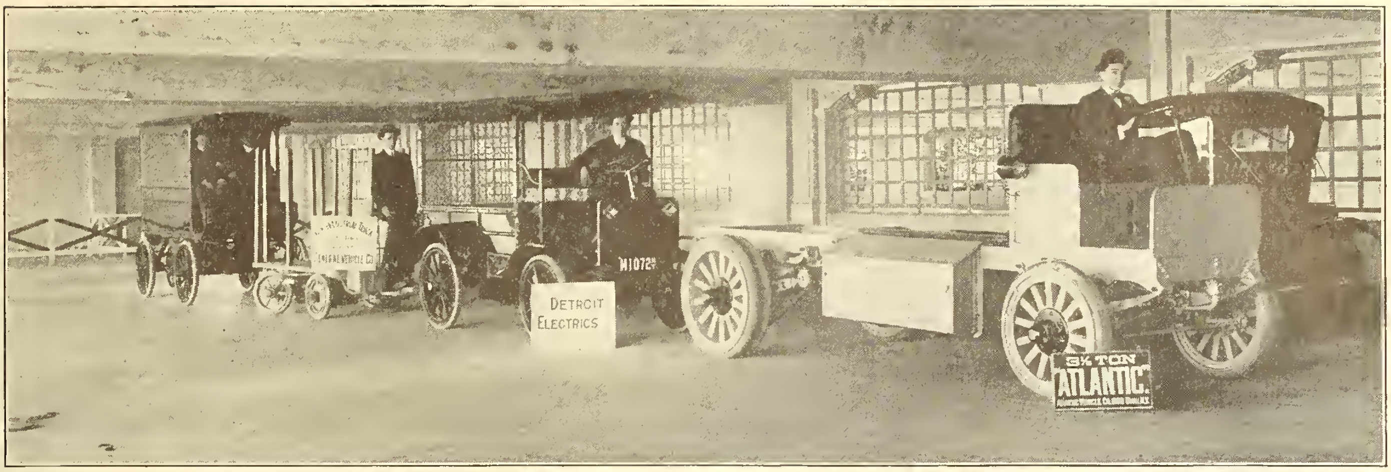
Australia Adopts the Electric

The Argo Electric Company, Saginaw, Mich., has just received notice from its Melbourne, Australia, representative that the two commercial electric trucks which were shipped March 20 last, arrived in first class condition. The machines met with universal approval by all who saw them with the result that two more have been ordered shipped at an early date to the same city. The Argo electrics are among the first commercial cars which have been introduced into Australia and this country bids fair to become one of Uncle Sam's regular buyers of motor trucks.

One rather comical feature in connection with the shipment of last March was that a number of the employes of the Argo company wrote their names upon the shipping boxes and in practically every instance the men received replies from Australian girls. This suggests a new field for romance.

Chicago Electric Announces New Model

Penrose Reed, sales manager of the Chicago Electric Car Company, announces several new models for 1914. Notable among these will be one with rear-seat drive. The rear seat is large enough for three passengers, without interfering with the operations of the driver. There is a revolving seat in the right front corner. The models will have the same limousine lines and the mechanical construction will not be materially changed.



Delivery Wagons Displayed at New York Electric Motor Show.

Announcements of Coming Automobile Shows

Part Played by the Electric in the Big Annual Displays

BY HAROLD M. SMITH

THAT the two national automobile shows to be held in the Grand Central Palace, New York, and at the Coliseum and Armory, Chicago, next January under the auspices of the Automobile Chamber of Commerce will be bigger and better in every way than any of their predecessors was made evident at a meeting of the Automobile Chamber of Commerce held in New York, at which floor space for both exhibitions was allotted to exhibitors.

The allotment of space was made under the direction of the board of directors, and members of the Automobile Chamber of Commerce were first to receive space assignments. The other applicants were classified and received space in the order of choice by lot.

Up to the first part of October there were 90 applicants for car exhibits for the New York show and 100 applicants for the Chicago show, the latter being a record number. The increase of the exhibitor's list for the Chicago show is due to the additional number of applicants for space in the electric vehicle section.

Of the 90 concerns applying for space at the New York show, 65 are members of the Automobile Chamber of Commerce, while of the 100 Chicago show applicants 71 are members of the organization. Since the closing of the lists of applicants six more concerns have applied for space for cars.

Applications for space to display accessories and parts are unusually large this year, not only in number but also in the amount of floor space required.

S. A. Miles, manager of both the New York and Chicago shows has departmentized the exhibitions. At the Grand Central Palace, New York, the automobile section will include all of the first and second floors, the wall spaces of the third and fourth floors and such other space as may be required to supply the applicants. At the Coliseum and First Regiment Armory in Chicago, the automobile section will include the entire main floors of both buildings and as much of the Coliseum basement and other space as may be required.

As has been announced the New York show will not be held in Madison Square Garden, as formerly, but will be in the Grand Central Palace, a magnificent building which is particularly adapted for this kind of an exhibition. The Garden would not be able to house one-half of the gigantic exhibition and for that reason had to be abandoned as the home of the New York show.

Manager Miles is now considering several plans for the decorating of the show buildings. He is striving to

Passenger Cars on Exhibition at New York Electric Motor Show.

get a scheme of decoration which will be dignified and ornate and in keeping with the character of the exhibits.

The following electric vehicle concerns will exhibit at the New York show which will run during the week of January 3-10: The Standard Electric Car Company; Waverley Company; Ohio Electric Car Company; Rauch & Lang Carriage Company; Baker Motor Vehicle Company; Anderson Electric Car Company.

Practically all of the electric car concerns which will exhibit at the New York show will also exhibit in Chicago during the week of January 24-31. The following concerns have applied for spjace at the Chicago show only: Chicago Electric Motor Car Company; Century Electric Car Company, Broc Electric Vehicle Company, Borland-Grannis Company, Woods Motor Vehicle Company, and Argo Electric Vehicle Company.

Features of the Broc

The Luxurious Broc electric, just received by the English Motor Car Company, of Los Angeles, is the magnet that is drawing many to the company's salesrooms to learn of the improvements in electric vehicles made possible by the electric's enlarged field of usefulness. Among the prospective buyers are many who are just realizing the advantages of this type of pleasure vehicle for use in the city and for suburban runs.

Clarence A. English, manager of the English Motor Car Company, is enthusiastic over his latest offering as he points out some of the main elements of distinction of the car. There is the French roof which not only avoids the top-heavy appearance of a straight-line roof, but allows more and ample head room; rounded back, vitally necessary if a brougham or limousine is to present a graceful appearance when viewed from the rear; tulip top, joining body to roof in a graceful curve; rounded windows on front corners.

"The Broc offers many features," Mr. English says, "not radical and obtrusive departures, incorporated as 'novelties' or 'talking points.' They lie rather along the line of added value—actual value—in comfort, convenience, durability, safety. Design problems worked out to absolute satisfactory solutions; materials which are nearly all of 'special' quality, with immediate rejection of any below the highest standard; workmanship, which is careful to a fault at every stage of every process; inspections, which are jealously thorough and never perfunctory—these things are the basis of the manufacture of the Luxurious Broc.

"A large car is not necessarily a comfortable car. The Broc electric is as large as comfort and good appearance require, and no larger. It is an unusually roomy car. It is not cumbersome, either in fact or appearance. The well-designed and properly located seats permit graceful appearance and beautiful lines in a car of ample size.

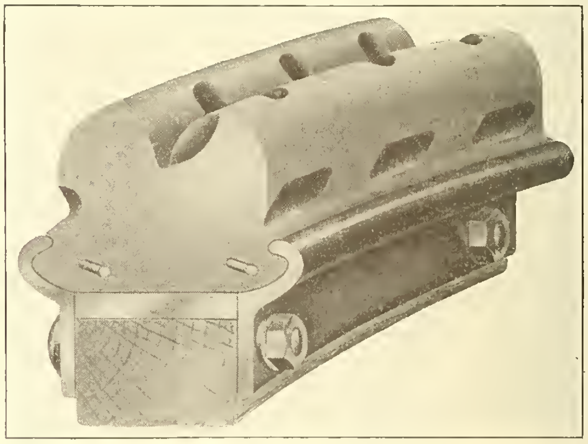
"In pleasant weather one often wishes to drive with front windows partly lowered, and this creates a problem which has been met in various ways by different makers. In the Broc the front window is made with an independent spring sash at the top. When the window is raised (closed) the spring sash engages the top of the window proper and holds it firmly so that there is no chance of rattling. With the window lowered to the proper height for pleasant-weather driving there is an abundance of air, and the rounded and finished edge of the window glass offers no obstruction to the driver's vision."

Motz S. A. E. New Cushion Truck Tire

After considerable experimenting a cushion truck tire has been produced that is especially designed to meet the adverse conditions under which motor trucks are used, and one that satisfactorily fulfills every requirement. The Motz Tire & Rubber Company of Akron, Ohio, originally directed its efforts toward the perfection of a tire for electric pleasure vehicles. The pronounced success of this tire caused truck manufacturers to insist on a tire with the same design for motor trucks. They fully realized that the sharp vibrations resulting from solid tire equipment were detrimental to automobile construction, but more especially to the mechanical parts of the machine.

In design, this new truck tire follows closely the construction of the pleasure car tire, incorporating such changes as were found advantageous from a practical standpoint, and which are the result of several years' experience in its use on commercial cars.

This tire is a "happy medium" between the pneumatic tire with its usual attendant troubles, and the ordinary solid tire. It is constructed with undercut sides which form slantwise bridges, and in addition has a dual tread. This construction, together with the high quality of rubber used in its manufacture, affords a highly resilient tire with the durability of a solid tire.



Motz Cushion Truck Tire.

Extending on the inner side of each tread at regular intervals are perpendicular indentations that effectively prevent skidding. This non-skid feature is effective until the tire yields its guaranteed mileage, which is for 10,000 miles one year. This guarantee covers defective material or manufacture, providing the tire is used under certain conditions based on the capacity of the truck.

The tire is claimed to have double the tractive area of the ordinary solid tire of the same rated size. This is an important factor involving an economical question that results in a great saving in fuel consumption. No power is consumed in turning wheels that are not constantly in contact with the road surface. In this way the machine is always propelled in an onward and not an upward direction.

Value of Electric Vehicles to Community

The Electric Vehicle Association of America opened its new season September 23, holding its monthly meeting in the Edison Auditorium, on West Twenty-seventh street, New York. There was a good attendance and much interest in the subject, "The Value of Power Wagon Operation on the Community," by F. J. Ryan.

Mr. Ryan's view was comprehensive and covered in a preliminary way the entire evolution of traffic from the birth of commercial carrying. Tracing development from the days of man-packing and mule-packing, down through wagon transportation and the coming of the steam railroad, the speaker suggested that motor trucks were chiefly of value because of their saving of handling merchandise.

"A very large percentage of the goods which are moved on steel rails by steam propelled wheels must be handled twice or more in transit, and it is here that the real benefits of commercial vehicle transportation are shown," said the speaker. "Stop to consider that it is within a brief period that the introduction of electricity and gas to a moving vehicle has been perfected, and you will realize that we, in the commercial vehicle industry, are factors in history that marks equally as great an advancement as did the evolution of the wheel centuries ago.

"How many people identified either in the trade or in business generally, appreciate that a large percentage of the world's goods transported by railroads is handled twice or more in transit? I do not think that 80 per cent is an exaggeration, and if such is the case and the commercial vehicle can show even an advantage of 5 per cent over the horse-drawn vehicle, it unquestionably means a saving of 10 per cent on a particular piece of material in transportation expense, and the saving to the consumer should be as 10 per cent bears in proportion to the money value of the material purchased.

"When I state that the commercial vehicle can show a saving of 5 per cent over the horse, I merely use that as a minimized percentage, as we know instances where 60 per cent is being saved by their use. The industry as a whole is passing through a teething period to which all industries are subject in their early development. The use of such vehicles, although numbering at the present time at least 50,000 in the United States alone, is but in its infancy. The advantages in the use of commercial vehicles have, unfortunately, been exaggerated in individual cases by salesmen more anxious to make a sale than to please a customer, and in consequence we hear of some failure in the use of this modern method of transportation. There are limitations which we all should recognize.

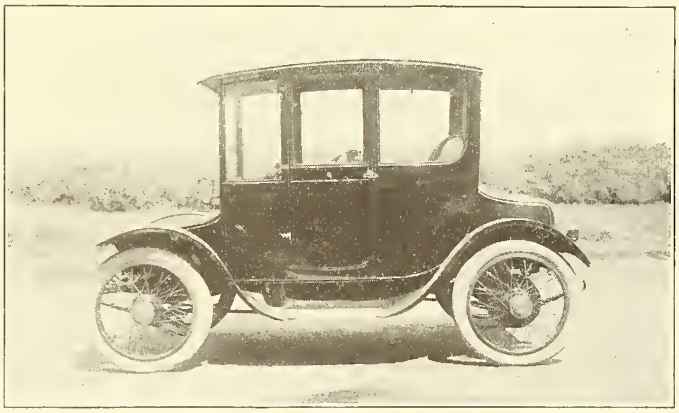
"Manufacturers, dealers, engineers, publishers and everyone who have to do with the sale of commercial vehicles should constantly bear in mind that by exaggerating the advantages of their product they are laying the foundation for a dissatisfied customer, but on the contrary, if they would realize and emphasize the retrictions in the use of a vehicle, that even then the sale and subsequent advantages of commercial vehicles, be they electric or gasoline propelled, are so great that each satisfied customer will make sales faster than the industry can take care of the demand.

"While many of the difficulties that are operating against us today are the result of transportation by means of horse-drawn vehicles, the necessity is today apparent for improved streets and roads, improved loading and unloading platforms, improved handling of merchandise within a building, and, last but not to say the least, the breeding of a new type of delivery superintendent who will appreciate that every minute that a commercial vehicle is standing still is wasted and costly."

Represents Borland on Pacific Coast

Henry L. Hornberger, one of the best-known automobile men on the Pacific Coast, has recently returned to San Francisco from a visit to the East covering a period of several weeks. Mr. Hornberger is to engage in business for himself on the Pacific Coast, and is to have the distribution of Borland electrics in the states of California, Oregon, Washington, Idaho, Nevada and Arizona, as well as British Columbia.

Mr. Hornberger will place dealers and will have general supervision of the agencies in the territory which has been assigned to him. Mr. Hornberger's knowledge of conditions on the coast is considered authority in the East.



Borland-Grannis Coupe Equipped with Rudge-Whitworth Wire Wheels.

While Mr. Hornberger is primarily a gasoline car man, he admitted recently in an interview that he was going to ride a new hobby this year, that hobby being the Borland electric. Knowing that the Borland has not had as wide a distribution as it was justly entitled to on the Pacific Coast, and after spending a few days at the factory of the company during the last week in August, Mr. Hornberger became most enthusiastic over the performance, simplicity of operation, and other features of the car. Having an intimate knowledge of the enormous number of electric passenger cars which are sold on the Pacific slope, Mr. Hornberger was thoroughly convinced of the remarkable business to be secured for the Borland-Grannis Company.

Mr. Hornberger will soon announce the address of his San Francisco offices and warehouse.

The Ford Motor Company has denied the rumor that the company contemplated the manufacture of electric storage battery propelled vehicles.

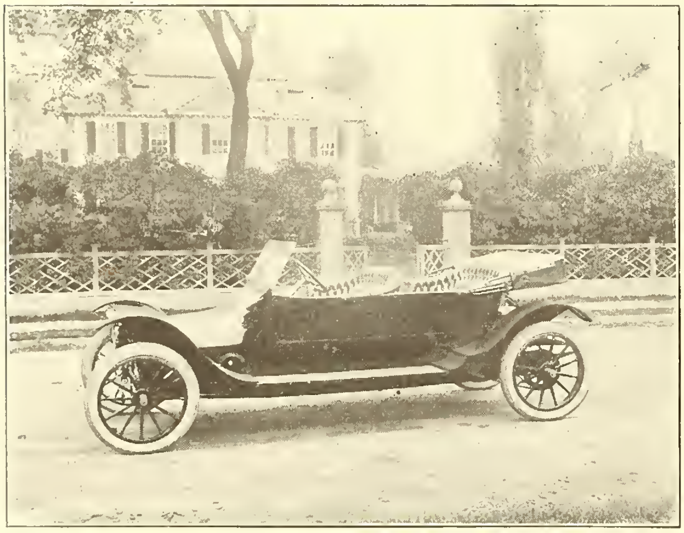
Bailey Roadster Covers 258 Miles

To demonstrate to the residents of the sections passed through and to the members of the National Electric Light Association in convention at Burlington, Vt., that the era of the electric roadster has really arrived, Col. E. W. M. Bailey, general manager for S. R. Bailey Company, made a long distance run in order to test the performance and ability of the roadster.

The route selected was from Boston to Fitchburg through Ashby, Jeffrey, Dublin and Marlborough to Keene, N. H., thence, in the evening, through Walpole and Bellows Falls to Springfield, Vt. Next morning, via Walpole to Rutland, thence through Brandon, Middlebury, New Haven and Vergennes to Burlington, Vt.

A total distance of two hundred and fifty-eight miles, including many detours of from two to six miles on account of road repairs, represents a performance run which many would have considered impossible by an electric, especially on account of the road difficulties which were negotiated.

Motorists who have been over this route will recognize that some parts of it present many difficulties in relation to speed, and even in relation to power.



The New Bailey Touring Car.

The average speed for the whole distance covered was exactly 19 miles per hour. Total running time on the road was 13 hours and 35 minutes. The slowest run, from Keene, N. H., to Springfield, Vt., 42 miles, at 16.7 miles per hour, was made almost entirely after dark. The fastest section covered was from Boston to Fitchburg, 21.3 miles per hour. The 78 miles from Rutland to Burlington (including detours) was made at exactly 20 miles per hour. The hardest part of the route was from Springfield, Vt., to Rutland, fairly mountainous, with repeated descents to valleys, and through several places of road repairs in process that could not be avoided by detours.

No adjustments or repairs of any kind were required or made on the way.

The car was a Model E Bailey roadster, equipped with 60 cells Edison battery, of the new A-5 size. It is not a special car, simply taken from service after having been run 10,700 miles during the last eleven months.

No attempt was made to run the car an extreme distance on one charge, such not being good touring practice and not necessary. The car was given a full, normal charge before leaving Boston. No full charge was given the battery en route, but partial charges were taken at five different places—Fitchburg, Keene, Springfield, Rutland and Biddlebury, at rates varying from 30 to 150 amperes.

The performance accomplished could, it is believed, be considerably improved by repetition. The operator had never before been over any part of the road beyond Concord, Mass., and had never even visited any of the cities or towns except Fitchburg and Burlington.

The time is not far away when the electric vehicle will banish distance limitations and will be considered as the ideal car for popular touring.

Pasadena Ideal for Electrics

D. B. Rose, Ohio electric agent, is enthusiastic over Pasadena, California, and the fine prospects for the sale of electric cars there. Mr. Rose has passed the last year in San Francisco where conditions are not the most favorable for electric cars, owing to the many hilly streets. Last winter the Ohio sold fifteen of the large double control cars in San Francisco where they are doing fine work on the heavy hills of that city. Mr. Rose at one time drove five people up to the very top of the Twin Peaks climb which is considered an extremely hard trip for gas cars. "The streets in Pasadena are the very best for electric cars I have seen anywhere in my trips up the coast," he said. "Next to Los Angeles and Pasadena, Portland is the best paved city on the coast. Portland uses very few electrics at present, but sales there have been held back by the poor charging facilities of service. People there do not realize the pleasures derived from owning and driving a fine electric car."

Fenders for Trucks in Detroit

Following the recent passage of the motor truck fender ordinance by the Detroit common council, the Detroit Automobile Dealers' Association has appointed a committee of motor truck men who have ordered the construction of a new fender built as according to the specifications drawn up by the special committee. The following Detroit motor truck men constitute the committee:

W. J. Gordon, Detroit manager for the Detroit Electric.

J. C. Ayers, manager for the G. M. C. factory branch in Detroit.

Jack Thompson, local dealer for Federal trucks.

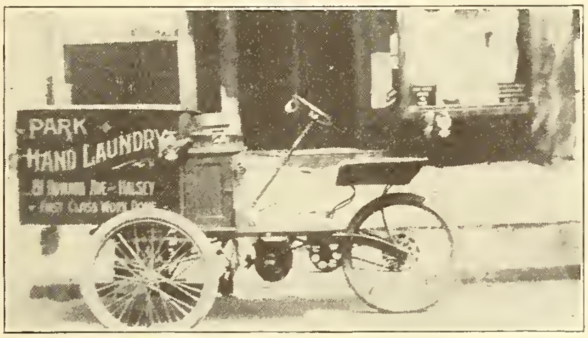
The fender was built under the committee's direction, after a conference with the police department, the common council and the local motor truck manufacturers, and is now being tried out on the G. M. C. truck. The fender is merely an experimental type, which will probably be improved after it has been given a thorough test under actual conditions which surround the use of motor trucks.

Front-Drive Proves Economical

The Couple-Gear Freight-Wheel Company has installed a fleet of four front-drive electric trucks in the service of the National Fire Proofing Company of New York City. This particular type of wagon is so constructed that seventy per cent of the load is carried upon the larger wheels.

An Electric Delivery Car

The photograph represents an electric vehicle used in the services of the Park Hand Laundry of Brooklyn, N. Y., and designed by O. E. Huebner, 131 Sumter street, of that city. The vehicle makes on an average of twelve miles per day, with the exception of Monday and Thursday, when it makes twenty-four miles. The average number of stops a day are estimated at 52. A 9-cell lead battery is used and it is found that charging every second night furnishes a sufficient charge to carry on a medium size laundry business. The vehicle has proven to be very successful in making deliveries.



Unique Vehicle in the Service of the Park Hand Laundry.

Trucks Increase in New York

Up to July 1 of this year 271 new trucks had begun operation in New York, increasing the total number of cars in service to 2,151, or practically forty per cent of all the commercial vehicles in the city. It is predicted that the figure representing the increase will be doubled before the year ends. Of the electrics in New York, 322 are used by brewers, 262 make department store deliveries, 197 furnish service for express companies, 154 deliver bread and 127 serve the central station.

It was announced recently that the Chicago branch of the E. V. A. had a total of 73 members. It is expected that the efforts of the members will increase the membership total to a hundred before the time of the national convention.

G. V. Truck For Newspaper Delivery

One of the early morning sights in Hartford consists of a certain General Vehicle one thousand pound truck. This electric delivery wagon, used in the delivery of newspapers, has a very interesting feature, in that its color is canary yellow. Henry P. Koppleman, a member of the House of Representativs in the Connecticut state legislature and a wholesale newsdealer, claims that the electric vehicle is the only method which is capable of obtaining a service during one of the busiest times of the day—that is, in the morning when the first edition comes in. The car is painted canary yellow so that the boys waiting for papers may see the vehicle from a distance. The car is also used for general city work. Mr. Koppleman claims that horse service can not be compared with it. The owner emphasizes the point that the service is vastly cleaner. Twenty-five miles is the daily average, the cost of service is about $45.00 a month.

Lansden Company Back In Newark

The Lansden Company, of Allentown, Pa., has returned to Newark, N. J., where it will again start up its business in the same factory that the company previously occupied. The removal is due to the efforts of H. L. Davisson, trustee in bankruptcy, to whom John B. Wickery, former sales manager of the Lansden Company, is acting as manager. The managers in bankruptcy believe that the company has on hand sufficient orders for electric vehicles to justify the move with the result that all creditors will be satisfied in due time.

The William Knobloch Company has opened a South Side station in Chicago for the maintenance by contract of electric passenger cars. The new station is located at 4137 Cottage Grove avenue, and can take care of over 1,000 cars on the plan outlined in our September issue.

The electric vehicle situation in New York at the present time, shows a total number of 1,944 electric vehicles garaged and in operation on Manhattan Island. This number includes both passenger and commercial cars. The actual statistics on the number of commercial cars in use are not available.

T. H. McGiehan,
Motz Tire Company.

George H. Kelly,
Baker Company.

William G. Bee,
Edison Storage Battery.

William C. Little,
Borland-Grannis Company.

PERSONAL AND BUSINESS NOTES.

T. H. McGichan, who for the past year has been general manager of the Motz Tire & Rubber Company, Akron, Ohio, was recently elected vice-president of that concern. Mr. McGiehan has had extensive experience in the automobile tire industry, being connected with the Goodyear Tire & Rubber Company before his affiliation with the Motz people. He is one of the best known men in this business. Mr. McGiehan predicts a prosperous year for the cushion tire for electric pleasure vehicles. "This tire being a happy medium between the solid, and the pneumatic with its attendant troubles," he says, "is sure to increase rapidly in popularity for electrics."

P. E. Bertsch, vice-president and manager of the Motz Tire & Rubber Company, was buried last Tuesday at Akron, Ohio. He has been ill for several months. Mr. Bertsch was one of the original men who put the Motz tire for electrics on the market. He was widely known in Chicago, especially with the trade, as he was in complete charge of the business until about seven months ago, when failing health compelled him to retire.

E. S. Kelley, tire expert formerly connected with the Chicago branch of the B. F. Goodrich Company, is now connected with the Firestone organization with headquarters at Chicago.

Uri B. Grannis, vice-president and general manager of the Borland-Grannis Company, manufacturer of Borland electrics, returned to Chicago recently from a trip through northern Canada.

Thomas A. Edison has returned to his laboratory at East Orange, N. J., following a motor trip through New England. Mr. Edison is reported to have improved in health.

R. S. Wiltrout, formerly manager of correspondence at the executive offices of the Stewart-Warner Speedometer Corporation, Chicago, is now connected with the John W. Blackledge Manufacturing Company, Chicago, maker of the Velvet shock absorbing springs, in the capacity of sales manager.

At a directors' meeting, held recently, the Baker Motor Vehicle Company of Cleveland advanced George H. Kelly from the position of manager of the truck department to the office of secretary and sales director. R. C. Norton, heretofore secretary and treasurer, will continue as treasurer. E. J. Bartlett becomes sales manager of the truck department and O. B. Henderson continues as sales manager of the pleasure car department. The election of Mr. Kelly as secretary comes after his splendid success in developing the truck department of the Baker company. Ralph Temple handles the Baker electric in the Chicago territory.

H. H. Doeing, eastern sales manager for the Rauch & Lang electric, is making an extended stay in Washington, D. C., in the interest of his firm. He is making his headquarters with the Bartram garage during his visit.

D. B. Rose, formerly western representative of the Ohio Electric Car Company, has accepted an agency at Pasadena, Cal.

B. B. Hood, formerly associated with the Baker Motor Vehicle Company, Cleveland, Ohio, has now become western representative of the Ohio Electric Car Company, with headquarters in San Francisco.

Mr. Marx, secretary and treasurer of the Ohio Electric Car Company, Toledo, Ohio, has just returned from an extended trip through the west, including the entire states of California, Oregon, Washington, Nevada, and Vancouver, B. C., from there east on the Canadian Pacific through Winnipeg and Minneapolis, Chicago and Toledo. Mr. Marx states that the western territory furnishes splendid possibilities for the sale of electric vehicles.

F. N. Carle has accepted appointment as master of transportation for the Electric Vehicle Association Convention, at Chicago, October 27 and 28.

The report of the receiver in bankruptcy of the Lansden Company shows that that company has assets of $304,000 and liabilities of $193,000.

The Tiffany Electric Company, which was recently organized at Pontiac, Mich., by E. L. Pelletier and others, to build electric vehicles, will begin the manufacture of a 1,000-pound delivery wagon about October 15.

R. W. Knowles has joined the organization of the Anderson Electric Car Company, Detroit, Mich., as engineer in charge of the truck department.

The Blackburn Specialty Company, Cleveland, Ohio, manufacturer of ground clamps and locks for electric automobiles, moved into its own new fireproof building, corner Thirty-fifth street and Perkins avenue, Cleveland, about October 1. The structure measures 70 by 100 feet in plan, and the company will have at its disposal for manufacturing operations nearly 30,000 square feet of floor space.

J. B. Magee, who has had charge of United States Tire Company advertising in the western district, will take charge of the new branch in Phoenix, Ariz.

The Falls Tire Company, recently organized by J. S. Buist and A. I. Stegrist, has decided to locate in Philadelphia, Pa.

W. W. Calahan has been appointed manager of the Milwauke-Wisconsin branch of the Goodyear Tire & Rubber Company, succeeding Herbert R. Ziegler, who goes to the Chicago branch.

The United States Tire Company is building a two-story and basement brick building at 5935-37 Baum boulevard, Pittsburgh, which will be used exclusively as a service station for its solid tire department.

The Moebus Wheel Company of Boston, capital stock $100,000, has been formed to manufacture wheels. A. F. McGettrick, G. B. Ryan and F. E. Peaslee are the incorporators.

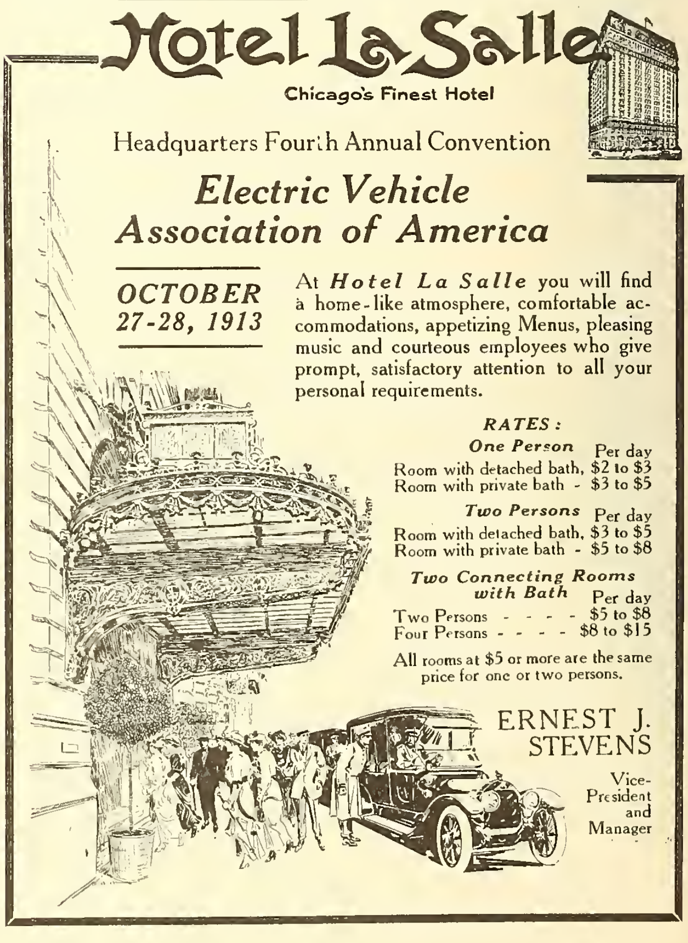
The W. C. Hendrie Rubber Company's tire plant has been opened and the manufacture of automobile tires for the western market has been commenced. The factory has outgrown its first dimensions, and additions and improvements costing more than $50,000 have been made since the plant was first planned. The factory was built and financed by Denver capital furnished by W. C. Hendrie and N. S. Ballantine, the cattle men of Denver, and will be capable of turning out 100 tires a day.
apolis has purchased a large plant on the corner of Ohio and
The Diamond Chain & Manufacturing Company of Indian-
West streets in that city, which will give it much needed manufacturing facilities.

Twenty electric baggage trucks will be installed at the new Union Station, Kansas City, Mo.

The Greensburg Tire & Rubber Company, of Greensburg, has been incorporated with a capital of $100,000. G. S. Rumbaugh, William Dunbar, John B. Hayden, W. F. Hayden, C. H. Wegley and W. F. Wegley are the incorporators.

Philadelphia Storage Battery Company, Ontario and C streets, Philadelphia, Pa., is sending out a series of blotters on which are shown various views of its thin-plate storage battery. These give a good idea of the construction of the Diamond grid plate and of the general arrangement of various types of the elements.

B. F. Goodrich Tire & Rubber Company has completed arrangements to open a Canadian branch factory at Toronto, Ont. The new plant will employ 1,800 men from the start, it is said.



Hotel La Salle
Chicago's Finest Hotel

Headquarters Fourth Annual Convention
Electric Vehicle Association of America

OCTOBER 27-28, 1913

At *Hotel La Salle* you will find a home-like atmosphere, comfortable accommodations, appetizing Menus, pleasing music and courteous employees who give prompt, satisfactory attention to all your personal requirements.

RATES:

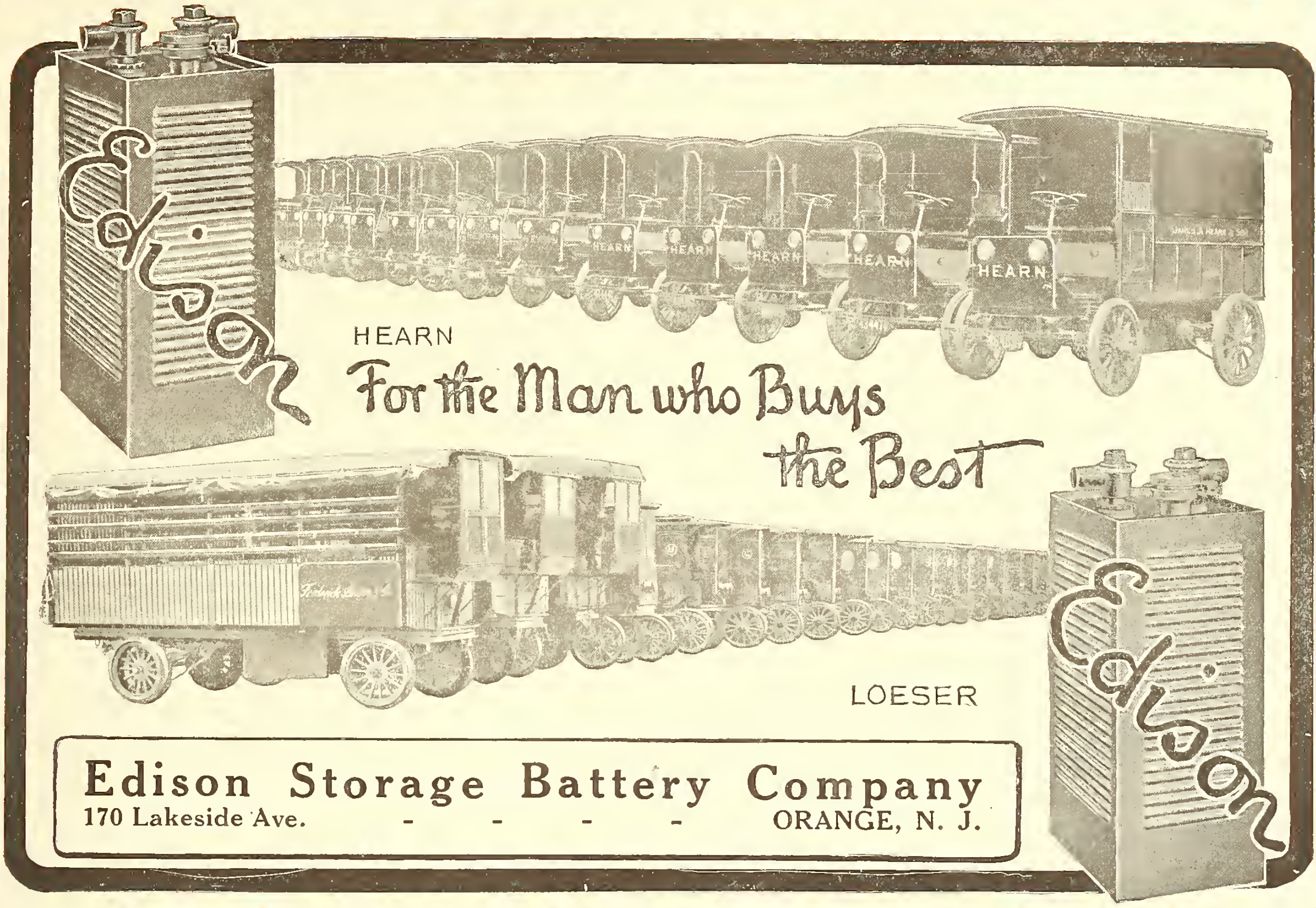
One Person Per day
Room with detached bath, $2 to $3
Room with private bath - $3 to $5

Two Persons Per day
Room with detached bath, $3 to $5
Room with private bath - $5 to $8

Two Connecting Rooms with Bath Per day
Two Persons - - - - $5 to $8
Four Persons - - - - $8 to $15

All rooms at $5 or more are the same price for one or two persons.

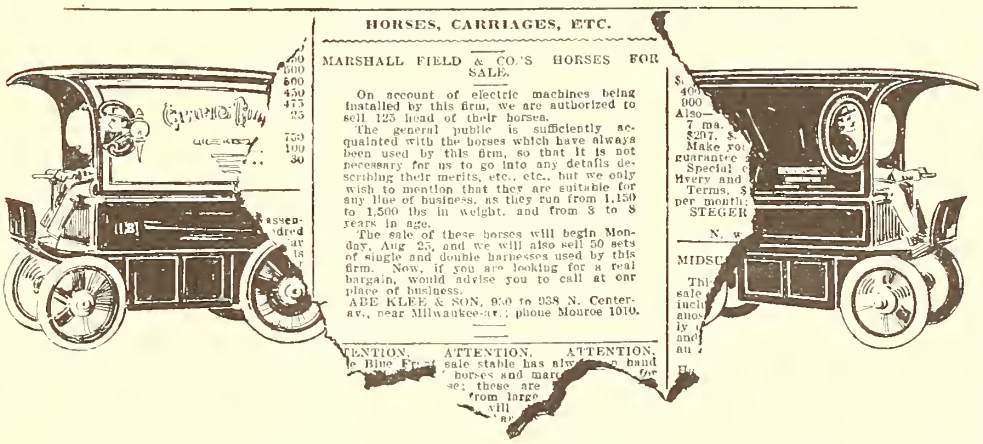
ERNEST J. STEVENS
Vice-President and Manager



Edison Storage Battery Company
170 Lakeside Ave. - - - - ORANGE, N. J.

Now You Can See Why Concerns Like Marshall Field & Co. Are Giving Up Horse Delivery

THE DAILY NEWS, MONDAY, AUGUST 25, 1913.



HORSES, CARRIAGES, ETC.

MARSHALL FIELD & CO.'S HORSES FOR SALE.

On account of electric machines being installed by this firm, we are authorized to sell 125 head of their horses.

The general public is sufficiently acquainted with the horses which have always been used by this firm, so that it is not necessary for us to go into any details describing their merits, etc., etc., but we only wish to mention that they are suitable for any line of business, as they run from 1,150 to 1,500 lbs in weight, and from 3 to 8 years in age.

The sale of these horses will begin Monday, Aug 25, and we will also sell 50 sets of single and double harnesses used by this firm. Now, if you are looking for a real bargain, would advise you to call at our place of business.

ABE KLEE & SON, 930 to 938 N. Center-av., near Milwaukee-av.; phone Monroe 1010.

Big mercantile establishments, who *must* have efficiency—regardless of sentiment—have sounded the death knell of the horse. Electric Delivery Wagons can do the work of horses better, quicker and cheaper. Snow or rain, scorching summer heat or zero temperature—the Electric does its work efficiently and without pause—twenty-four hours a day, if you like—every day in the year.

Electric Delivery Pays Best—Saves 10% to 25%

Not only Marshall Field & Company, but many other concerns in all lines of business have found by searching investigation that Electric Delivery Service is most satisfactory. The annual saving averages from 10% to 25%. Learn *today* what Electrics can do for your delivery system.

Interested business men can get a fund of valuable information about Electric Commercial Vehicles by conferring with our Electric Vehicle expert. No obligation. Just telephone Randolph 1280. Today is the best time.

Commonwealth Edison Company 120 West Adams Street Chicago

Electric Trucks Give Long Service

RELIABILITY is the keynote of Electric Vehicle design and construction. Note these facts:

There are several Electric Trucks of 1899 model still running.

F. A. Poth & Sons Brewery, in Philadelphia, is using daily an Electric Truck delivered eleven years ago.

Several of the Electric Trucks operated by the New York Edison Company have been in use ten years. An Electric has been used by Frederick Loeser & Company, Brooklyn, for eleven years; another by Stern Brothers, of New York City, for nine years. Three of the Electric Vehicle fleet of Tiffany and Company were delivered to their firm early in 1901. Three of the Electric Trucks owned by Arnold Constable & Company, New York City, were purchased in 1903, and an Electric built for B. Altman & Company in 1898 is regularly used.

The price of electric current for battery charging is constantly decreasing. During the last ten years the average price throughout the United States has decreased over 328 per cent.

The average cost of all Electric Commercial Vehicles preceding 1911 was $3369.72. In 1911 the average was $2465.18—*and the trend is steadily downward.*

You really should investigate Electric Trucks now.

Send for this Book Today "The Story of the Electric Truck"

The facts and figures that you want to know about the Electric Truck are contained in this beautifully printed book of 32 pages—yours on request. Cost of operation—actual photographs of newest model Electric Trucks. Send for it today. Kindly address Dept. B

Electric Vehicle Association of America

BOSTON 124 W. 42nd St. New York CHICAGO

ELECTRIC VEHICLES

Vol. 3 CHICAGO, NOVEMBER, 1913 No. 11

BAILEY ROADSTER PASSING LONGFELLOW HOUSE, CAMBRIDGE, MASS.

ANNOUNCEMENT

ELECTRIC VEHICLE MAINTENANCE WITH BATTERY RENEWALS

¶ The William Knobloch Company, electric vehicle maintenance contractors, has added a South Side Service Station to its equipment for the entire upkeep of Storage Battery Vehicles at greatly reduced costs, and at this South Side Station pleasure cars only will be cared for. Commercial cars only will be served henceforth at the company's West side station, 950 West Randolph Street.

The New South Side Station is located at

4137 COTTAGE GROVE AVENUE

and has a capacity for over 1000 cars on maintenance

¶ If you own an electric vehicle, find out about this Knobloch Service. It enables you to know in advance exactly what the upkeep cost for your car—both for the battery and all mechanical parts—is to be. You reduce it all, in this service, to a small monthly fee.

¶ The service automatically, as you can see, eliminates all that illegitimate repairing and check-making tinkering, as, under this maintenance service, the more satisfactorily your car is in operation for you the more profitable our business is.

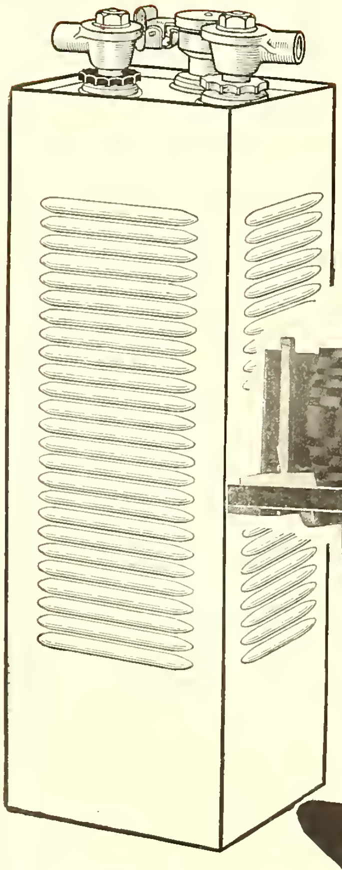
¶ **Compare that proposition**—A postal card or a phone call, Monroe 5387, will bring a representative with full details of a money-saving and satisfaction-giving electric vehicle maintenance service.

William Knobloch Company

West Side Station—950 W. Randolph St.
(Commercial Cars Only)

South Side Station—4137 Cottage Grove Ave.
(Pleasure Cars Only)

A Boost at Noon and Home Soon



Edison-Nickel-Iron-Alkaline Storage Battery
Haffenreffer & Co. Brewers
Boylston
Lager Beer
Haffenreffer & Co.
Try our Malt Wine
A Nutritive Tonic
~ Brewed on Honor ~
Established 1870
Edison Edison Edison Edison
Edison-Guaranteed for four years - Edison

The Batteries in this Electric Truck can be "Boosted" (charged) at several times their Normal Rate during the noon hour—they must, therefore, be Edison.

Edison Storage Battery Co.
170 Lakeside Avenue
Orange, N. J.

GUARANTEED FOR 4 YEARS

Published Monthly By
ELECTRICITY
MAGAZINE
CORPORATION

Monadnock Building
CHICAGO

Entered at Chicago Post Office
as Second Class Mail Matter

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WITH WHICH IS INCORPORATED IGNITION
TRADE MARK REGISTERED IN THE UNITED STATES PATENT OFFICE

SUBSCRIPTION PRICE
Domestic - $1.50
Canada - - $1.75
Foreign - - $2.00

FOR SALE AT ALL
NEWS STANDS

If Your News Dealer Will Not
Supply You—Please Notify Us

Volume III **CHICAGO, NOVEMBER, 1913** **Number 11**

The Fourth Annual Convention of the E. V. A.

The Biggest Meeting of Electric Vehicle Men Ever Held

BY PAUL H. WOODRUFF

THE fourth annual convention of the Electric Vehicle Association of America was called to order by the president, Arthur Williams, at 10:30 Monday morning, October 27, 1913, in the Red Room, Hotel La Salle, Chicago. Mr. Williams, commented on the intense interest displayed in the meeting. He said that up to that time about three hundred had registered.

The first order of business on the program being the presentation of the president's address, Vice-President Frank W. Smith took the chair. Mr. Williams gave as usual a very complete and exhaustive review of the work of the Association during the past year and what there is before it. The address appears on another page. It is the custom to have the president's address referred to a committee, and the vice-president appointed Hayden Eames, of Cleveland; E. E. Witherby, of Chicago, and W. P. Kennedy, of New York as the committee.

Francis Whitney Smith, President.

Frank W. Smith was born in Alden, New York, June 22, 1867, the son of George Henry and Mary Matilda (Drake) Smith. On his mother's side the family goes back to Sir Francis Drake, the famous English navigator. He was brought to New York City when a boy and sent to the public schools. In 1880 he started as office boy for the United States Illuminating Company. He was a general clerk until 1889, then paymaster for the United Electric Light and Power Company. After two years he was made assistant auditor and eight years later elected assistant secretary. One year later he was elected secretary of the Brush Electric Illuminating Company, New York, and in 1905 elected secretary of the United Electric Light and Power Company, being elected vice-president in 1912. He holds both positions today and is a director of both corporations. He is also a director of the Electrical Show Company. He belongs to the Engineers' Club, the Friars' Club, the American Institute of Electrical Engineers, the New York Electrical Society, the Municipal Art Society, the American Museum of Safety, the National Electric Light Association and the Electric Vehicle Association of America. Now president of the latter.

Harvey Robinson, Re-elected Secretary.

Day Baker, Re-elected Treasurer.

President Williams then resumed the chair and called for the report of the secretary, Harvey Robinson, which was read as follows:

The third year of our Association's life, October, 1912, to September, 1913, has witnessed a quiet, persistent movement in internal affairs and a general extension of the Association's work along educational and cooperative lines. The various activities of the Association are covered quite broadly in the address of the president, the statement of the treasurer and the reports of the various standing committees. There is, however, a great deal of detail and routine work of a character interesting to the membership which occupies the attention of the secretary's office and it is perhaps proper at this time to make brief note of these items.

The volume of work done in the office during the past year has been so far in excess of that accomplished in any preceeding year that it is difficult to make comparisons, but some idea of the relative bulk may be formed when it is stated that the outgoing mail totaled 30,000 pieces, 22,000 of which were first-class. Incoming mail totaled 4,692 pieces, among which we counted 1,016 replies to advertising, 2,506 first-class letters on other subjects, 1,070 pieces of second-class mail. This last classification included a large number of magazines containing Asso-

Arthur Williams, New Director.

ciation publicity. It was deemed advisable to go through these publications and clip out all interesting articles for preservation in the Association archives.

A considerable number of the advertising inquiries demanded a lengthy and detailed reply making necessary at times special investigations and compilation of figures.

Some of the letters requested articles of from one to five thousand words about the work of the Association and the electric vehicle situation in general.

Other requests were for statistics oftentimes difficult to obtain, such as:

"How many electric cars passenger and commercial in each state of the Union?"

"What is the annual output of each electric vehicle manufacturer, and to what states do the cars go?"

"How much has each manufacturer's output increased during the past year?"

"How many electric car garages in the United States?"

"What are the rates for charging service in different cities of the United States?"

"What special efforts have been made to induce business men to use the electric truck?"

"What efforts have been made to introduce the electric in the South where road conditions are poor?"

The Association has held eight monthly meetings in New York during the year. The average attendance at each meeting has been about 150 members and guests. Each meeting has been announced to a mailing list of 1,000 persons. When the subject under discussion has been of general public interest, invitations have been extended to the members of civic organizations in and around New York City. When papers have been printed in advance of the meeting they have been mailed to our members and discussion has been pre-arranged. Copies of the papers and short reports of the meetings have been supplied each month to the magazines and newspapers.

The press has been generous in volume of Association publicity, and for this co-operation we extend our thanks.

Clare N. Stannard, New Director.

It may interest you to know that our convention announcement was mailed from the secretary's office to a list of 5,000 companies and individuals. A pre-convention magazine and newspaper story was, through the courtesy of the editorial bureau of the New York Edison Company, spread throughout the country, going to some 150 publications.

During the year our membership has grown from 317 to 439, an increase of 38.5 per cent.

Membership in each classification is as follows:

Active, 97 (Manufacturers 35, Central Stations 62); Auxiliary, 8; Press, 14; Associate, 320. Strange to relate but rather gratifying is the fact that our New England Section and our Chicago Section are now showing an equal number of members, 78 each.

The bulk of our membership seems to be in the eastern states, where we find 298 members. The middle states claim 116 members, and there are 17 west of the Mississippi river. The Philippine Islands, Canada and Europe are represented by 8 members.

It is gratifying to note the interest taken in our Association by engineers, scholars and business men of Europe. We have been glad to respond to numerous inquiries with not only our papers and discussions but copies of our constitution and by-laws, detailed descriptions of our organization, and reports of the general progress of battery propelled vehicles in this country.

Our growth in membership is entirely due to the efforts of our assistant secretary, Miss M. C. Johnson, who was appointed by President Williams in March of this year. The creation of an assistant secretary has been a great relief and a notable gain in efficiency in the work of the secretary's office, particularly with regard to general correspondence, records of Association and committee meetings, follow-up committee work, compilation of statistics, and the establishment of a clipping file and magazine index.

In closing it is but fitting to record a vote of thanks to the New York Edison Company for courtesy and liberality in supplying the secretary's office with a headquarters properly and well appointed, and in furnishing stenographic and mailing services. It is indeed true that the Association could not have progressed as it has without such aid.

Opportunities for extending the work and increasing the value of the Association loom large for the future. Provisions for obtaining additional funds with which to extend our work will remove the only serious obstacle to better progress. Members are daily proving their loyalty, and this evidence gives us hope for means of accomplishment. Our thought should be that there is every reason to look for further growth and extension of influence in the near future.

The secretary's report having been received, Treasurer Day Baker stated that the funds of the association during the past year have been divided into three separate funds: the association fund, which receives contributions from the members in the shape of dues; the fund for advertising 1912-13, from which the bills for advertising during the past year have been paid; and the new fund, the campaign fund, 1913-14. He then submitted the following report:

ASSOCIATION ACCOUNT.

Receipts—			
Balance from 1912	$1,762.90		
Annual dues	4,154.27		
Miscellaneous items	99.59		
Interest	24.72		
Total receipts association account			$6,041.48
Disbursements—			
Printing reports, papers, stationery and notices	$2,318.08		
Postage	158.91		
Rent and stereopticon for New York meeting	157.50		
Boston convention expenses	159.03		
N. E. L. A. convention expenses	150.00		
Subscriptions to Central Station	357.00		
Auditing books 1912	83.50		
Signs and emblems	325.94		
Payment to N. E. Section	171.50		
Payment to Chicago Section	211.00		
Secretary's salary	625.00		
Clerical services	118.00		
Overpayment	5.00		
Bank charges (exchange)	3.96		
		$4,844.42	
Amounts used to assist 1912-1913 advertising fund, which are properly chargeable to 1913-1914 publicity fund		$ 847.68	
			$5.692.10
Balance cash on hand Oct. 1st, 1913			$ 349.38

1912-1913 ADVERTISING FUND.

Contributions to fund		$42,036.52
Dec. 30, 1911—Received from interest	$ 75.44	
Jun. 29, 1912—Received from interest	178,48	
Sept. 30. 1913—Received from interest	112.85	366.77
Amounts chargeable to 1913-1914 fund—		
Booklets and conventions	$747.68	
Central Station	100.00	
Sept. 30, 1913—McJunkin Adv. Agency	231.60	1,079.28
		$43,482.57

Disbursements—		
For advertising and mechanical charges including drawings, set-ups, cost of electrotypes, miscellaneous postage and other miscellaneous items		$43,133.27
Balance 1912-1913 P. & A. fund		$ 349.30

1913-1914 ADVERTISING FUND.

Amount subscribed—		
Central stations	$18,671.38	
Vehicle manufacturers	5,250,00	
Accessory	10,550.00	
Total		$34,471.38
Subscriptions received to October 1st, 1913		5,451.66
Balance due from subscribers		$29,019.72
Amount received	$ 5,451.66	
Matrices sold	57.75	
Interest	22.67	
Total receipts 1913-1914 fund		$ 5,532.08
Voucher drawn No. 286		231.60
Balance in 1913-1914 advertising fund Oct. 1, 1913		$ 5,300.48

Following the report, Mr. Baker said:

> There is one thing I would like to call attention to. In our general fund we are spending our money a little bit faster than we are receiving it. The general fund, including refund for 1913-14, is about $1,100.00, whereas at the commencement of the year we had $1,762.92, which means that we should really increase our membership service in order to keep our Association fund in good shape and have plenty of money to do our work.

The report was received and placed on file, and the president made the following statement:

> I would like to draw your attention to a sort of summary of that report. It must be clear to you that after less than four years of life this Association is now spending fully fifty thousand dollars a year in promoting the electric vehicle industry. If you add the advertising expenditure to our general expenses of last year, the two closely approach fifty thousand dollars. I think that that record for money expended to promote the best interests of the vehicle industry and central station industry is without any precedent whatsoever in the annals of the electric industry generally.

The next in the order of business for the morning was the reports of the committees, all of which are printed elsewhere in this issue. The first report was that of the Legislative Committee, of which P. D. Wagoner is chairman. In Mr. Wagoner's absence Mr. Curtis presented this report. He was followed by William P. Kennedy, who presented the report of the Committee on Operating Records. This report gave rise to much interested discussion, most of which is reproduced on another page. The Committee on Insurance next reported through its chairman, Day Baker, which also brought forth considerable discussion. Stephen G. Thompson, on the Committee on Papers, delivered his report. The Committee on the Establishment of a Course of Instruction in Electric Vehicle Practice, reported through Charles Blizard, as its chairman, William G. Pancoast, was not present. After the discussion which followed, Homer Niesz made announcement on behalf of the convention committee of the entertainment features which had been prepared, including a dinner at six o'clock, a visit to several model electric garages, and a smoker and cabaret at half past ten. In addition he invited the guests to the regular weekly luncheon of the Chicago Section held at 12:30 that day.

John F. Gilchrist then presented the report of the Committee on Rates and Charging Stations. It and its discussion will be found on another page.

The president remarked on the fact that Col. E. W. M. Bailey, of S. R. Bailey & Co., who was driving an electric roadster through to Chicago from Boston, had been reported at Cleveland, and a good deal of interested comment followed. The story of Col. Bailey's ride is told at length in this issue.

The president announced that during the afternoon session Vice-President Frank W. Smith would preside during the presentation of the first two papers, and John F. Gilchrist during the last two. He then appointed a Nominating Committee consisting of George H. Jones, E. W. Curtis, R. L. Lowell, E. S. Mansfield and Charles Blizard, to report the first thing Tuesday morning. Adjournment was then taken until two o'clock.

MONDAY AFTERNOON SESSION, OCTOBER 27.

The meeting was called to order by the vice-president, F. W. Smith, shortly after two o'clock. The first number on the afternoon program was a combination report by the several chairmen of the local sections and other clubs identified with the electric vehicle movement, as to what the sections are doing. As chairman of the Chicago Section, Homer E. Niesz presented the report on behalf of that section. In the course of this report Mr. Niesz incidentally gave strong commendation to this publication, Electric Vehicles, as being worthy the support and co-operation of the Association members, in which Chairman Smith as strongly seconded him. The report and discussion are presented elsewhere.

The Chicago report was followed by that of J. A. Hunnewell for the New England Section; Day Baker for the Electric Motor Car Club of Boston; and Harvey Robinson for the New York Electric Vehicle Association.

During the hearing of these reports the chairman announced that a meeting of New England dealers would be held at the conclusion of the session to discuss transportation and other problems. It was also stated at this point that applications for twelve new memberships—eleven associate and one active—had been received, and the chair invited other applications.

Day Baker announced that Mr. Babcock had arrived with the Buffalo delegation, bringing communications from the mayor and the Chamber of Commerce of Buffalo, urging that the Association hold its 1914 meeting in that city, and pointing out the advantages of such a selection. The matter was referred to the Board of Directors of the Association. The chairman then read a letter from Joseph E. Baker, of the Washington Water Power Company, dated October 24, bearing on the projected organization of a Pacific Coast Section.

After discussion had ended on Mr. Robinson's report for the New York Electric Vehicle Association, F. Nelson Carle read his paper on "The Merchant, the Central Station and the Electric Truck." This paper and its discussion will appear in the December number.

In accordance with previous arrangements, F. W. Smith at this point turned the chair over to John F. Gilchrist, who acknowledged the honor in a few words and proceeded to call upon E. L. Callahan for his paper, "Co-operation Between the Electric Vehicle Manufacturer and the Central Station," which will appear, with the vigorous discussion which followed its presentation, in an early issue of Electric Vehicles.

Dr. E. E. Pratt, manager of the Industrial Bureau of the Merchants' Association of New York, was then introduced by Chairman Gilchrist with the statement that he would bring a new viewpoint to the attention of the meeting—that of the merchant who purchases and uses the electric automobile. Dr. Pratt's paper was entitled, "Traffic Problems and the Automobile," and while it was presented in abstract, it will appear in full in an early number of this paper, together with the discussion which ensued.

The chair then announced that the session for the following morning would be held in the Grand Ball Room of the hotel. The meeting was then adjourned until ten o'clock Tuesday morning.

ANNUAL BANQUET OF THE ELECTRIC VEHICLE ASSOCIATION.

At six o'clock on Monday, October 27, a Beefsteak Dinner Was Served in the Grand Ballroom of the Hotel La Salle with an Attendance of 266 Members and Visitors. The Guests Divided Into Little Groups and New Acquaintances Were Made and Old Ones Renewed. As the Participants Were Seated, a Five-Piece Orchestra Rendered Popular Airs, and the Diners Enthusiastically Joined in the Refrain. The Dinner Was One of the Features Characteristic of the Convention That Left with Those Attending a Lasting Impression.

ANNUAL BANQUET, MONDAY EVENING, OCTOBER 27.

At 6:30 Monday evening guests of the Association to the number of 266 assembled in the big banquet hall on the nineteenth floor of the Hotel LaSalle for the festive event of the convention. At the west end of the big room an orchestra had been installed, and from its raised platform sent forth chords for the guidance of those in the assembly who wished to sing popular airs. About 266 voices joined in the chorus. While the attention of the guests was concentrated on the *piece de resistance* of the banquet, which was a thick red beefsteak, the orchestra discoursed by itself the proverbial sweet strains.

The menu, while not extraordinary for length, was of high amperage, well calculated to charge the exhausted batteries of the conventionites who had been negotiating the rough roads of discussion and climbing the steep hills of oratory since the noon boost. Provision had even been made for those who felt that they could not wait for the big charge; for at the east end of the banquet hall screened off from the dining tables, was a commisarial garage where glasses of chemically pure electrolyte and small slabs of active material were eagerly siezed by the impatient ones.

The feature of the banquet was the absence of speakers, speakers' table or toastmaster. This very considerate arrangement enabled the diners to devote the occasion to getting acquainted with their table-mates and enjoying the well-known tempting viands. As a result, many lasting friendships were made, and, doubtless, many good strokes of business consummated in spite of the unwritten law against shoptalk.

Following this highly practical and satisfactory event the cars began lining up in front of the hotel for the garage inspection trip. One car after another rolled up to the curb, picked up a load of sight-seers, and whirled away for the city's south side. The electrics were driven, in most cases, by district salesmen of the cars which were represented.

The first garage visited was the "Fashion," on Fifty-first street and Cottage Grove avenue, some six miles from the Hotel La Salle. As this garage was fully described in the September issue of ELECTRIC VEHICLES, it will be sufficient to say here that many a well-versed electric vehicle man from some other part of the country murmured as he gazed about, "*Some* garage!"

There was a good deal to see at the Fashion, lots of questions to be asked and notes to be taken, and the inspection took quite a long time. Gradually, however, little groups of visitors became saturated with information and slipped out, to roll away for the next point of interest. This was the block between Fifty-first and Fifty-second streets on Lake Park avenue, which contains both the Hyde Park and the Elite garages. At these stations and also that of Wm. L. Rudd and Company, 1112 E. 47th street, further examples in Chicago charging, housing and cleaning practice were studied with a close application that betokened the value of the excursion.

The last garage visited was one of the chain operated by the Carson, Pirie, Scott & Co. department store for its big fleet of electric trucks. Here the latest ideas in handling commercial cars were investigated by the committee of the whole, much to the apparent satisfaction of everybody.

The convention program had, as its last Monday item, "Smoker and Cabaret, 10:30 P. M." So well timed was the garage trip that without apparent effort, the returning inspectors reached the hotel at about 10:20, just in time to grab a front seat.

Clustered around the tables in individual parties, the guests indulged in a genuine Dutch luncheon. Those well reputed delicacies of potato salad and steaming hot frankfurters with plenty of hops and good-fellowship were keenly appreciated in satisfying the brisk appetites of the participants. Souvenir cigars and the refilling of steins greeted the opening number of a very clever and high-class cabaret bill of artists. Fantastic dancing teams, melodies in ragtime, character songs and original comedians promoted continuous applause and hilarity. As the curtain dropped before the closing number, the spectators departed after a delightful evening's entertainment.

TUESDAY MORNING SESSION, OCTOBER 28.

The meeting was called to order by President Williams at 10:30 A. M. The president announced that entirely through oversight the report of the Garage Committee was omitted from the previous day's proceedings. F. F. Phillips, the chairman of that committee, not being present, E. S. Mansfield presented the report, very largely by abstract. This report and its subsequent discussion will appear next issue.

As a result of this discussion, Mr. Street, of Chicago, made a motion that the Association recommend to the manufacturers that they allow central station companies which are operating public garages and who are not agents, a discount on repair parts, and effort should be made toward a mutual agreement between the local agent and the manufacturer, so that the central station may have a discount. The motion was put to a vote and carried.

The president then called upon the Committee on Nominations for its report, and its chairman, George H. Jones, submitted the following:

For president, Frank W. Smith; for vice-president, John F. Gilchrist; for secretary, Harvey Robinson; for treasurer, Day Baker; for four directors to take the place of four retiring, Arthur Williams and Clare N. Stannard to succeed James T. Hutchings and Louis A. Ferguson, and William G. Bee and W. P. Kennedy to succeed themselves.

This report being received, the chair appointed for the election three inspectors, H. C. Cushing, R. E. Russell and John Meyer. Hayden Eames was then called upon for the report of the Committee on the President's Address, which report is printed in connection with the address on another page. After its reading Maxwell Berry delivered his paper on the "Charging of Batteries in Unattended Garages." George H. Kelly and E. J. Bartlett followed with their paper entitled, "Electric Vehicle Salesmanship."

The nearness of the noon hour prohibited long discussion of these two papers. The president announced that since the convention opened there had been twenty-four new applications for membership, which the secretary promptly corrected to twenty-seven. The assistant secretary, Miss Johnson, predicted that there would be twenty-five more before the meeting closed, and the president opined that gentlemen in this section of the country who had made such promises to a lady would fulfill them. Four copies in dummy form of the booklet on electric passenger cars to be published by the Association were then distributed for the inspection of the members.

"The Electric Vehicle in Department Store Service," by C. A. Duerr and David F. Tobias, was presented by the latter in somewhat abstracted form. After a short discussion, the president gave it as his understanding that all suggestions and recommendations as to the printing and circulating of papers and reports were referred automatically with power to the incoming administration. Mr. Niesz then made an announcement of the complimentary luncheon to be given at 12:30 by the Commonwealth Edison Company.

Printed ballots had been circulated and it was announced that the polls would be open between 12 and 2 o'clock, the tellers to receive the ballot at 2 and announce the election immediately thereafter. The last paper of the session, "Recent Developments in the Lead Battery for Electric Vehicles," was then presented in abstract form by Bruce Ford. Discussion of this paper was held over for the afternoon session. The secretary, just prior to adjournment for the Commonwealth Edison luncheon, presented for the consideration of the members the following amendments to the constitution:

Amendment to the Constitution of the Electric Vehicle Association of America, providing that Section Chairmen shall be Associate Vice-Presidents of the Association. New matter in *italics.*

ARTICLE V.

OFFICERS AND DIRECTORS AND THEIR DUTIES.

Section 1. The Officers of the Association shall be a President, Vice-President, *Associate Vice-President corresponding in number to the branches of the Association,* a Secretary and a Treasurer. The offices of Secretary and Treasurer may be filled by one person. The (officers) *President, Vice-President, Secretary and Treasurer* shall be elected from the members in good standing at the annual meeting to be held on the second Tuesday of October in each year. Elections shall be by ballot. *The Associote Vice-Presidents shall be the duly elected chairmen of the branches and shall hold office from the date of their election at the annual meeting of their respective branches. The formation of a new branch shall automatically create a new Associate Vice-Presidency.*

Section 2. The President, or in his absence, the Vice-President, shall preside at the meetings of the Association and of the Board of Directors.

Sections 3, 4, 5. No change.

Section 6. There shall be a Board of Directors which shall include the President, Vice-President, *Associate Vice-Presidents,* Secretary and Treasurer, ex-officio, and twelve members of the Association.

On this subject the president said:

"My understanding is that your affirmative vote on those proposed changes will make it practicable for those changes to take effect at the next directors' meeting thirty days hence. The whole object is to bring the vice-presidents of the sections into the Board of Directors and make them a part of our working organization and thus improving the efficiency with which the affairs of this association shall be conducted in the future."

Mr. Witherby moved the changes be adopted, Day Baker seconded the motion, and upon being put by the president, it was declared carried.

COMMONWEALTH EDISON LUNCHEON OCTOBER 28, 12:30 P. M.

The hospitality of Chicago's big central station company furnished an extremely pleasant memory for a long time to come to the guests who sat in the main dining room of the Hotel LaSalle Tuesday noon. Congenial little parties surrounded each table and discussed substantial refreshment and shoptalk with impartial enthusiasm.

The luncheon meeting was presided over by L. A. Ferguson, vice-president of the Commonwealth Edison Company. After the pumpkin pie and coffee had disappeared he addressed the happily surfeited diners as follows:

Gentlemen, it gives me great pleasure on behalf of the Commonwealth Edison Company to welcome you to Chicago. I think it is quite natural that you should hold your convention here in this city because, if I am correctly informed, there are more electric vehicles, pleasure vehicles and commercial cars in Chicago than any other city in the world. I say that after having consulted with Mr. Frank Smith, the newly elected president. I told him that I supposed he wouldn't be surprised, but I asked him if he would feel hurt if I made that statement. Everybody in the world knows that Chicago speaks for itself, but I was particularly concerned not to offend New York. We have something like two thousand electric pleasure vehicles on the streets of Chicago, and I think seven hundred commercial vehicles. During the last year the income of the central station company from the supply of electricity for charging vehicles amounted to two hundred thousand dollars, so you will see that this branch of the central station business is by no means a small one. As an indication of the growth of this particular branch I might mention that in the year previous the income was one hundred thirty thousand dollars, so that the increase in one year is roughly seventy-five per cent. We hope that through the efforts of the manufacturers who have been so active in Chicago this rate of increase will continue indefinitely. Chicago is especially adapted for electric vehicles and that is probably the reason why there are so many here. The roads, while not good, are perfectly flat, at least in the center of the city. We have a boulevard system that extends all around Chicago. You can drive from the extreme north end to the extreme south end; not quite the extreme south, we will say from the northern end to the southern part of the city and to the western end of the city all by the way of boulevards. In other words, you can make a complete circle around the city without going off a boulevard, and that probably accounts for the fact that there are so many pleasure vehicles of the electric class in the city.

Mr. Ferguson then introduced, as the speaker of the occasion, Hayden Eames, who, he said, was a man trained as an engineer, graduated from the Naval Academy at Annapolis, and a pioneer in the electric vehicle industry. Mr. Eames then gave a very interesting talk on cooperation, which will appear in an early number of Electric Vehicles.

When Mr. Eames had concluded, and the applause had died down, the chairman took occasion to express his pleasure in the nomination of Frank W. Smith for the presidency. He said he had known the nominee for a good many years as a man who does not work with a flourish of trumpets, but quietly and very effectively. He asserted that the Association would know by results that Mr. Smith had been at its head, and called on him for a few words, to which Mr. Smith responded as follows:

This is the second time within a very short period that most of us in this room have enjoyed the great western hospitality of Chicago. During the recent convention of the National Electric Light Association most of us here knew what the Commonwealth Edison Company's hospitality means. Today we have another evidence of that. The fact that your Nominating Committee has done me the honor of nominating me as president of your Association would be looked upon by me with many misgivings if I were not very familiar with the electric light men and the men in the electric light industry in all of its branches, and if I were not familiar with the way in which the electrical men co-operate, one with the other. The fact that Mr. Gilchrist has done this Association the honor to accept the nomination of vice-president is a sort of encouragement to me to go on with the work. Mr. Eames said that someone had stated to him earlier in the day or had asked him if it were not a fact that the work of the Association was over. He disagrees with that statement quite properly, and I disagree with it. I believe the work is just starting. We start in with our fourth year of life with the end of this convention. What we have done is as nothing to what we can do and that can only be done and can only be accomplished by the incoming administration with the hearty support and co-operation of the members of the Association individually and collectively.

As President-elect Smith sat down, President Williams arose and gracefully extended to the Commonwealth Edison Company the thanks of the Association for its splendid hospitality. Mr. Ferguson responded in similar vein, expressing the pleasure of the company in doing all that it could for the Association, and declared the meeting adjourned.

TUESDAY AFTERNOON SESSION, OCTOBER 28.

The meeting was called to order by President Williams at 2:30 p. m. There being no further discussion on Mr. Ford's paper in reference to storage batteries, the president asked S. C. Harris to abstract a paper on vehicle batteries which he had prepared for another convention. This paper will be published in an early number of this magazine.

At the conclusion of the discussion the president announced that three or four more new members had come in since morning. He also commented on a resolution which had been handed to him signed by fifteen members or prospective members asking for permission to establish a branch of the Electric Vehicle Association of America in the vicinity of Philadelphia, to be known as the Philadelphia Section. This, of course, was mentioned only to show how the movement is spreading, and was referred to the incoming administration.

The time having arrived for the report of the tellers upon the election of officers and directors for the ensuing year, the president asked Mr. Cushing to present that report. He announced that the officers and directors proposed by the Nominating Committee had been unanimously elected, which was greeted with great applause. The chair called upon President-elect Smith for a few words. Mr. Smith said:

> I wish to say just a word, to repeat the statement that I made at the lunch that I appreciate more than I can say in a few words the honor you have done me. If I can measure up to the work that has been done in the past three years by Mr. Blood, who had the affairs of this Association under his capable management for the first two years, and by my very good friend, Mr. Williams, your retiring president, I shall be well satisfied. I can measure up only by the support of you gentlemen. The real work will devolve upon the committees. The president of this Association or of any allied association is more or less of a figurehead proposition and I must depend upon the work of my fellow directors and the members of committees to accomplish the real result. I know that I shall have your support and if enthusiasm and a great belief in the electric vehicle can increase the activities of this Association, I am sure that we can look forward to great things in the future. I thank you very much.

Mr. Mansfield made a motion that a vote of thanks and appreciation be extended to the retiring president for his active and efficient work during the past year and that this be spread upon the record and sent to him, which motion was duly seconded and upon being put by the president-elect was declared unanimously carried.

Mr. Williams acknowledged the action, modestly claiming that the real work of the Association during his administration had been carried on by the officers and committees, the wisdom of which course was well shown by the success of the electric vehicle movement in Chicago. He then asked that Mr. Smith, before assuming the chair, present the report of his Committee on Publicity and Advertising. This report, being of great importance as accounting for the large expenditures of the year, is presented in full on another page.

After the discussion of the report, J. S. Codman told something of the experiences of Colonel Bailey, who was on his way to Chicago in his electric roadster. The substance of Mr. Codman's remarks is incorporated in the article on Colonel Bailey's ride. J. E. Hale made a motion that the Association send a telegram to Colonel Bailey, if his address could be learned, expressing sympathy and wishing that he could be present. C. F. Smith amended the motion by substituting the word "congratulations" for "sympathy," and in that form it was carried, Mr. Codman offering to supply the address.

The president expressed the disappointment of the meeting that Walter Wardrop was unable to deliver an address, calling instead upon E. R. Whitney for the paper of his brother, F. E. Whitney, on "Electric Commercial Vehicle Tires." This paper will appear in Electric Vehicles at an early date.

Mr. Whitney, being chairman of the Standardization Committee, was asked for its report. He explained what the committee was doing in gathering information, on tire efficiency as well as other lines. He then read the committee report, which is published in full elsewhere in this issue.

There was considerable discussion of this report, and some difference of opinion as to whether it should be received and filed as a progress report or as recommended practice. It was finally adopted as a recommendation.

The president announced at this point that the total number of registrations during the convention was 351, about 100 more than last year; 210 from Chicago and 41 from out of town. Applications had been received for 39 new memberships, 30 from Chicago and the rest from Peoria, Ill.; Pontiac, Mich.; Orange, N. J.; Philadelphia, Pa.; San Francisco, Cal.; Akron, O.; Cedar Rapids, Ia.; Boston, Mass., and Camden, N. J. If the convention could have lasted a few hours more, the president said he believed a hundred could have been added.

Mr. Mansfield here rose to remark that it had been, in his opinion, the most successful convention the Association had ever held, and he thought that everybody would leave it with renewed enthusiasm and the feeling that the future of the electric vehicle is very bright. He moved that a vote of thanks be extended to the Chicago Section for the garage trip, the dinner and the smoker and cabaret; to the Commonwealth-Edison Company for the luncheon; to Mr. Stevens, the manager of the Hotel LaSalle, and the various convention committees who all served to make the convention a grand success; and to the writers of papers and those who attended the convention and the city of Chicago.

The president, before putting the motion, wanted the delegates to understand that ninety-nine and nine-tenths per cent of the work of preparing for the convention was done by the local convention committee headed by Homer E. Niesz and his able assistants. The motion was then carried by a unanimous rising vote.

Mr. Lloyd stated that he had come to the convention with the intention of inviting the Association for its next convention to Philadelphia, and promised that the Philadelphia Section would, in that event, show the visitors as good a time as they had in Chicago. The president replied that the invitation would be recorded.

Mr. Young called attention to the fact that Mr. Niesz's committee had taken care of the ladies who attended, and had seen that they were well entertained; which, remarked the president, was only another example of the good work of the Niesz committee.

The meeting was then entertained by an extemporaneous address by Ralph Temple. Its reproduction from the stenographer's notes will appear in an early issue. During the ensuing discussion the new vice-president, John F. Gilchrist, entered, and the president called upon him. Mr. Gilchrist responded to the invitation in the following words:

Gentlemen, this is rather short notice to be called upon for a speech. If I had known what the occasion was I certainly would have removed my coat before I came in. That would have been a good bluff that I had been here all afternoon. I realize fully the importance of the work that this Association is doing, and I think that perhaps from the standpoint of a central station man the most important work is to work among the other central station men and get them in the correct frame of mind towards the electric vehicle situation in general. I have not had a great deal to do with the manufacturing of electric vehicles although I have had some experience as a manufacturer in certain lines where the product tended to assist central station men, and I can assure you that from that experience I can take a very sympathetic view of the position the manufacturer is in. I believe that the central station has at the present time and possibly in the future very much the best end of this trade, of this relation between the manufacturer of electric vehicles and the central station, and I believe that it is up to all the central station men to see that their brothers in business take that view of it. Going back to a comparison that has frequently been used by Mr. Williams, until very recently your president, I presume there are a hundred thousand draft horses in the city of Chicago, and it is reasonable to expect that the ordinary user of traffic vehicles would have no objection to paying the same amount for electricity for electric vehicles that he does for horse feed. Supposing twenty-five thousand electric trucks would be what we might reasonably expect to get within the next ten years to displace those horses, I figure roughly that it would mean an income to the Commonwealth Edison Company, if it sold the energy, of about five million dollars a year. That would be an increase of nearly thirty-three and one-third per cent of its present gross annual income. Now, if we can get five million dollars a year additional income from this source we will make in the years that we can have the business, more money, I believe, than the vehicle manufacturers will, and on an assumption of three thousand dollars apiece for a truck we will certainly wish you gentlemen God-speed with seventy-five million dollars of first costs that you may get in selling trucks. I am a thorough sympathizer with the manufacturer—at least when I get on this platform—and the benefit of these meetings and the benefit of an association like this is to try to keep our view when we get to our desks up to the same standards that we have in these meetings.

I told Billy Bee, as I sat next to him at dinner, a little story. It may not be new to some of you, but I thought as vehicle men you would appreciate it. A fellow came home one night a little bit full and he lit a match and staggered across the hall from the door to the stairway, and in so doing he ran into the baby carriage. He stiffened up, rather dignified, and remarked, "Damn Fords, see them everywhere."

What we want in the electric vehicle business is a Henry Ford. I know that you have heard that statement a good many times, but here is the position that a central station man finds himself in very frequently, and a broad-minded man can't help but see the difficult position. Some patrolman or some lamp trimmer, or perhaps it is an inspector of pole lines, will come in and say, "I need a vehicle of some sort. I have been using a motorcycle, or I have been going on horseback, or I have been going on foot. Now I ought to have some kind of vehicle." "Well," you say, "what will a vehicle cost?" "I would like to get a Ford, maybe, because it only costs five hundred dollars." Now you are in a position where you are trying to get your nerve up to buy that man a five hundred dollar vehicle to assist him where he has had no vehicle before, and you will try to make up your mind whether it will pay to give him a four-wheeled vehicle as against a motorcycle, and when on top of that you have also to decide the question as to whether you will pay twenty-five hundred dollars for an electric vehicle instead of five hundred dollars for a gasoline vehicle, it doesn't help you out any. Furthermore, I presume this is largely due to the lack of demand. There has not been a great amount of development in the type of vehicle that the electric light people can use for their service men. You would hardly expect to put a trouble man in an electric brougham and send him through some of the alleys on a rainy night. It has got to be a vehicle which is adapted to the particular use, and I believe that it would pay the vehicle manufacturers to study that side of the proposition. I think that if you can construct a vehicle possibly on a basis of getting orders for a large number of them in advance it will be a valuable service. We cannot have many uses for an electric truck, except where a company has a good many country circuits. With such a company, if you could get the cost down not to exceed three times the price of what you can buy a gas car for, and perhaps down to double, the market for that type of vehicle is going to increase and you are going to find very many more among central station people who are sympathetic and who are inclined to adopt electric vehicles.

Mr. Gilchrist concluded, and as he sat down the audience realized that the big convention was at an end. The president said he felt that the words of the speaker were just what was needed to send the members of the Association away with renewed ambition and with a look into the future which made it very obvious. Then, with a few fitting words, he declared the fourth annual convention of the Electric Vehicle Association of America adjourned.

Circular Unique

One of the most elaborate jobs of engraving and printing which has come to our attention for a long time is a large circular, size 42½ by 31 inches, recently published by the B. F. Goodrich Company. A copy of this circular was sent to every tire dealer in America to show the magnitude of Goodrich service and Goodrich advertising.

As the circular is unfolded from the envelope, a typewriter message with letters nearly a quarter of an inch high meets the eye with a greeting from the advertising manager, "This letter was dictated, typewritten and then enlarged—but it is personal to you nevertheless. I felt it would take a big circular to tell you about the big things we are doing for Goodrich tire dealers."

The letter goes on to outline the extensive advertising plans which the B. F. Goodrich Company is carrying out and which are illustrated on the center pages of the circular.

Filling almost the entire inside spread is a huge half-tone 39 by 22 inches.

In the center of this big cut is a map of the United States, overlaid with reduced specimens of recent advertisements of the B. F. Goodrich Company which have appeared in magazines, newspapers, farm papers, trade papers, etc.—advertisements which have verily covered the entire country like a blanket, as the illustration so aptly suggests.

The location of each Goodrich branch in America is noted by a tiny tire with a black center upon which the name of the city is shown in white.

E. C. Tibbitts, advertising manager of the B. F. Goodrich Company, makers of Goodrich and Diamond tires, had the following to say about this circular:

"The magnitude of our campaign was never so thoroughly impressed upon the Goodrich organization as when we started to work to connect up all the different links in our big chain of newspaper, magazine, billboard, painted wall, electric sign, farm paper, trade paper, road sign work, house organ work, booklets and other co-operative methods, which we use to stimulate interest on the part of Goodrich dealers and our Goodrich sales force."

The Anderson Electric Car Company, which is represented in Chicago by D. E. Whipple, manufacturer of the Detroit electric, reports the sale of a large number of ambulances and patrol wagons during the last eight months. Among the more recent sales was that of two vehicles to the city of Memphis, Tenn.

Colonel Bailey's 1,500 Mile Ride

From Boston to Chicago in an Electric in Seven Days

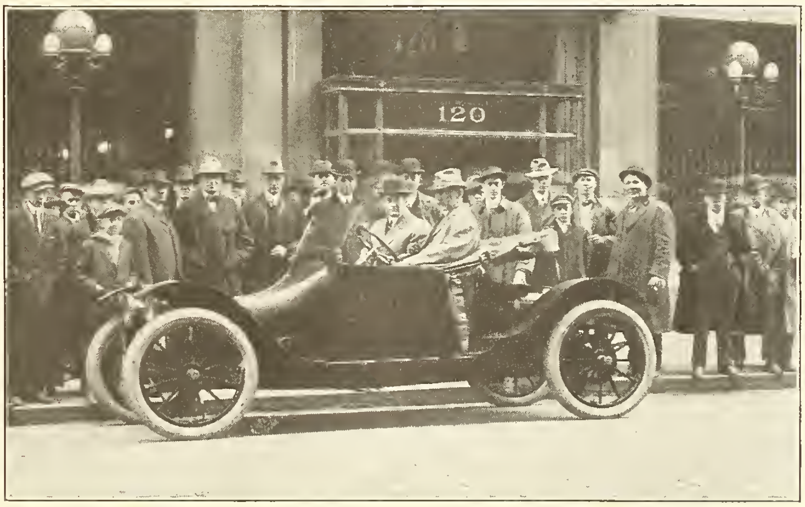
BY FRED B. SCHAFER

On October 14, Colonel E. W. M. Bailey of S. R. Bailey and Company, Amesbury, Mass., left Boston in a Bailey electric roadster, on the first stage of probably the longest tour ever made by an electric vehicle. En route to Chicago by way of New York, the roadster passed through Worcester, Springfield and New Haven,, covering a total distance of 239 miles in eleven hours and eight minutes running time, absorbing all road stops, including stops made to receive partial charges taken at Worcester and Springfield. The run to Springfield was made against a strong head wind; that to New Haven, a distance of 66 miles, was made at 23.5 miles per hour, the entire distance traversed at an average of 21½ miles per hour. After a stop over night at New Haven, the run of 78 miles into New York City, the next afternoon, was made on one charge with an average of 20 miles an hour.

Colonel E. W. M. Bailey.

Arriving in New York City, Colonel Bailey spent several days at the New York Electrical Exposition and Motor Show, where he was received with great enthusiasm amid predictions of the future success of the electric vehicle for long distance touring. On October 19 the roadster again continued on its course, finishing its first day's run on its arrival at Albany, having covered a distance of 150.3 miles with the aid of an additional charge received at Poughkeepsie. During this run and, indeed, for the following ten days, a continuous rainfall, reported to be the heaviest of the entire year, kept the roads in a wet and heavy condition. On reaching Albany, the car was placed in a garage to be charged. However, in the morning (Monday, October 20), on arriving at the garage it was discovered that the car had been forgotten and still remained to be charged before the trip could be resumed. The roadster was transferred to the electric lighting company's plant, but as it was impossible to obtain a high rate of charge, practically a day was lost, only eighteen miles being covered to Schenectady that evening.

On Tuesday the trip was continued up the Mohawk valley, against a strong head wind with frequent heavy rain squalls, to Utica. This distance of 79.8 miles was covered in four hours and fifty-one minutes, and four miles of it consisted of open highway construction. At Utica an additional charge was received before making a run of 50 miles to Syracuse, making a total record for the day of 129.8 miles.



Colonel Bailey's Arrival in Chicago; at the Commonwealth Edison Building.

On Wednesday the weather was fair during the day, the roads constantly improving. A stop was made at Geneva for a boost, and the run to Rochester, 46 miles, was completed in two hours. After another partial charge in Rochester, a run of 77 miles to Buffalo was made after dark with a light rain falling, 173½ miles having been covered that day. This was the best daily record made. The excellent condition of the roads allowed the colonel to maintain a very high speed. The average mileage from Syracuse to Geneva was slightly in excess of twenty miles an hour; from Geneva to Rochester it was just under twenty-three miles an hour; and from Rochester to Buffalo slightly in excess of twenty miles an hour.

At Buffalo, after a half-day stop on special business, the tour was resumed. Ten miles out of Buffalo, the road conditions changed entirely. As far as Painesville, Ohio, there were no macademized roads, very little of even gravel roads, and while they are reported to be quite passable in dry weather, they were exceedingly atrocious under the influence of the week's rain. Nevertheless on Thursday, a distance of 104.3 miles was made to Erie, Pennsylvania, with a boost midway at Dunkirk, New York.

Friday morning, the rain coming down harder than ever, the start was late on account of the poor charging facilities. The road course in this particular territory was exceedingly difficult to negotiate. Several deep river bottoms had to be passed by means of steep descents and ascents through the clay banks. The power used in this section was about four times as much as that used previously, and very few cars of any kind attempted to travel.

Ashtabula, 45 miles out, was reached too late to get the full charge required, because the station was about to take on its night load and needed the full capacity of the exciter. Satur-

An Emergency Boost Was Received at a Sawmill.

The Roadster Negotiated Mud Roads Near Ashtabula, Ohio, Successfully.

day morning a very slow charge caused considerable delay. Over some very bad roads leading into Cleveland, the car was in serious difficulties for the first time on the trip. Buried in the mud, forty-five minutes were consumed in releasing the car, which, however, was accomplished under its own power. Another delay was caused by the arrest and fine of the colonel for running his car into a road construction. After much delay the roadster arrived in Cleveland, having covered 59.6 miles.

In Cleveland a stop was made over Sunday, devoted to rest and road information. The latter proved discouraging in that the road out of Cleveland was reported to be practically impassable. Sunday morning, the Cleveland delegates to the Electric Vehicle Association convention in Chicago met and congratulated the colonel on his arrival.

Over a wet and soggy road, Norwalk, Ohio, was reached and the roadster given an additional charge. This distance between Cleveland and Norwalk is 61 miles and the condition of the road was so vicious that many of the larger type of gas cars were unable to negotiate it under the conditions existing. On reaching Fremont the odometer registered 65 miles for the day's mileage.

On Tuesday, a section of 33 miles to Toledo was traversed over good, but quite worn and wet macadam roads. A heavy charge was taken at Toledo during the day and the run was continued in a westerly direction. Some ten miles from Toledo the macadam road ended, and the rain-soaked clay and sand roads continued to the Indiana line. The night was spent at Wauseon and a boost taken at Archbold, whereupon the roadster, after 85 miles of travel, entered Kendallville, Indiana. The Indiana roads were in better condition, although heavy from the recent rains.

Thursday morning opened with a brisk snowstorm, turning to rain. A boost was taken at Goshen, Indiana, arriving at South Bend early in the afternoon, where the colonel was met by many automobile enthusiasts. The night was spent at South Bend, a total distance of 61 miles having been covered that day.

Friday terminated the tour. The day was bright, but a stretch of 27 miles to LaPorte was made over a very difficult roadbed, wet and heavy. The remaining 76 miles to Chicago were completed under perfect conditions, although two or more hours were lost through mis-direction in East and South Chicago.

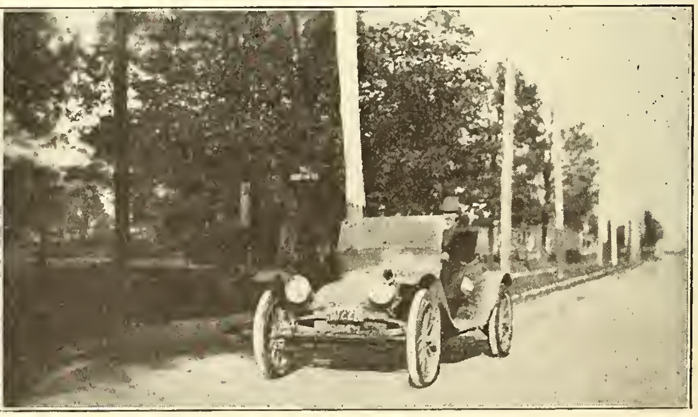
The trip was completed without accident to the car or failure of any part. While some of the days' runs were short and the speed low, they were not inferior to gas car records. The car was mired four times during the trip, but came out under its own power in every case but one. Many gasoline cars were passed on the road, but very few indeed passed the electric roadster. Colonel Bailey reports that had the weather conditions been fair, the ride would have been a pleasure and the run could easily have been made at an average of about 150 miles per day at good motoring road speeds.

Receipts were taken for arrival and departure between stopping places. The total distance covered on the route was 1,302.5 miles.

The average running speed for the entire distance was 17.8 miles per hour. The average speed absorbing all road stops was 15.7 miles per hour. These stops included not only those for inquiring the way, railroad gates, etc., but for getting arrested and going to court, stopping for luncheon, changing tire chains, getting out of mire, and other cause for delay.

The 239 miles from Boston to New York were made at 21.5 miles, absorbing all stops. In fact, on all good

An Excellent Gravel Road at Pinhook, Ind.



La Porte, Ind.—Boston Street, But 1,200 Miles from Copley Square.

roads 20 miles per hour was exceeded in spite of rain.

Colonel Bailey, in Chicago, after his spectacular trip, took occasion to comment on the uniform courtesy and interest of the central station men whom he met along the route. Furthermore he insists that but for the weather conditions, which were about as bad as possible and therefore a splendid test, the trip would have been practically without adventure—a safe and sane procedure open to any driver of a good electric.

Relative to the matter of courtesy, the colonel mentions several rather amusing incidents. The most striking of these was the occasion when the 1,200 horse power engine of a sawmill was started up to furnish a boosting charge of a few kw. for the Bailey car.

The car used was a Model F roadster, from stock and untried, equipped with a General Electric motor and 60 cells A-6 Edison battery. Colonel Bailey was accompanied by Herbert J. Foote as a traveling companion.

On arriving in Chicago, the colonel was met by a committee of delegates who conducted him to the Illinois Athletic Club, where, in honor of his feat, a dinner was given and attended by the following:

Homer E. Neisz, F. S. Marr, D. C. Arlington, C. B. Freyer, F. S. Wagner, H. J. Foote, E. G. Westlake, D. S. Hatch, W. E. Keily, E. J. Mock, J. S. Codman, A. A. Gray, R. Macrae, W. J. McDowell and G. H. Jones.

Standardization Committee Report

To the Convention of the Electric Vehicle Association of America

CHARGING PLUGS.

AFTER accumulating data and giving careful consideration this committee recommends the adoption of a larger sized concentric type plug and receptacle, in addition to the one previously adopted, to take care of heavier trucks. The dimensions recommended, which apply to the fit of plug in receptable only, being the same as the larger plug now in more or less general use, namely: Inside contact 7/16 inch diameter, outside contact 1 13/32 inches diameter. The plug having a rating, which has been approved by the underwriters, of 150 amperes and an over-load rating of fifty per cent on 225 amperes.

There is at present a variation in the practice of different manufacturers in regard to the polarity of terminals. A circular letter was sent to all manufacturers; twenty replies were received. Thirteen are using the concentric type plug. Nine of these thirteen make the center terminal negative. Four make the center terminal positive. Apparently also, and this is the important consideration, by far the larger majority of vehicles now in service have the center terminal negative. In view of the above, the committee recommends that the Association adopt as standard practice, outside terminal positive, inside terminal negative. Further recommends that as soon as a data sheet can be prepared, embodying complete information on both plugs, it be sent out with a letter to all interested parties, urging the prompt adoption of the standard type plugs and a prompt change of polarity, both on new vehicles and those in service, to agree with the above.

SPEED AND MILEAGE RATINGS.

The committee, realizing the importance of a uniform basis of rating for speed and mileage on one battery charge, has attempted to get together sufficient data to determine the consensus of opinion, or rather the best practice to be followed. As there are so many factors which affect both speed and mileage, and as we have not been able to obtain sufficient information to warrant a definite decision, no recommendation is made at this time. This question will be followed up and an attempt made to arrive at a definite basis of rating before the next convention.

TIRE EFFICIENCY.

This committee has been asked to formulate and recommend for standardization, a definite method of testing tires for efficiency, and a definite method of expressing the efficiency. There appears to be considerable confusion, especially among the tire manufacturers, on account of the various methods now in use.

The committee is giving this subject serious consideration and has sent out a circular letter asking for data, suggestions and advice. Returns are not sufficiently complete as yet to warrant a recommendation.

LAMPS.

An attempt is being made to arrive at a basis of standardization of voltage, candle power, shape and size of lamps. The practice is so varied, and apparently based on good reasoning in most cases, that no definite decision can be reached at this time. The committee hopes, however, to be able to outline a plan by which the large variety of lamps now being used will be materially reduced.

METHOD OF PUBLISHING INFORMATION ON STANDARDS.

In order that standards which have been adopted may be put in definite shape and sent out in concrete form, the committee recommends the adoption of a data form, 7 by 10½ inches, consisting of a single sheet where this will give sufficient space, and in pamphlet form with two or more sheets where more space is required, and punched at the left hand side for insertion in standard binders.

That ends the formal report. The committee also investigated a number of plugs that have been manufactured and found that they were not made sufficiently accurate to insure interchangeability and proper contact in all places, so they have settled on certain tolerances to insure straight interchangeability. There is at present a variation in the practice of different manufacturers in regard to polarity of terminals, as has been pointed out.

DISCUSSION.

MR. CHAPIN: Information has been gathered from three of the largest companies operating service inspection departments (not necessarily garages) that the concentric plug today is still not what it ought to be for two reasons; one is that all types of electric apparatus are used, and central stations have had to deal with the concentric plug especially where there are two of them and have had difficulties to maintain perfect alignment, and it is impossible for an attendant to go to a work bench and take a file and restore its condition when it once has been burned. Another reason is, I am informed, that three of the largest manufacturers of electric apparatus in the United States have in process of development a series of plugs not only for electric vehicles but for heavy current consuming devices, and at the present time there is before the National Electric Light Association a committee gathering information which expects to make a recommendation for attachment plugs for large current consuming devices, and I believe that action should be deferred until we are able to profit by possibly one more year's experience.

Mr. Conant: I want to call attention to the importance of this standardization work and of co-operating so far as possible with the Society of Automobile Engineers, which is doing very important work in this matter of developing and establishing standards and in seeing in a general way that they are followed. This report is an excellent one; they have been very conservative in their recommendations, and my only thought would be that if it is accepted it would be with the suggestion that they take it up with the proper committee of the S. A. E., so that we may not only co-operate with them but incorporate, possibly, this standard in their regular formulas. I know they would be very glad to have it, and I am confident that engineers here are members of that body and are guided very largely by its recommended practice.

Mr. Lloyd: As I understand it, that report is principally a report of progress, and I therefore move you that it be received and filed.

This motion was seconded.

The President: Is there any discussion on this point?

Mr. Whitney: That is largely a report of progress, but there were two or three definite recommendations made which I think urgently require action. One is a larger standard plug, the necessity for which has already been proven by the fact that most manufacturers of heavy trucks are already using larger plugs, but the fact that it hasn't been adopted as a standard means there are a lot of the old ones still in existence. Next is the question of polarity. As I pointed out, there are two methods in existence, and right here in Chicago some vehicles have the center terminal positive and the others the center terminal negative, and neither side will change. I understand they are only waiting for some official action by this Association before they will make a move. I would like to see those two points definitely acted on.

The President: As I understand the recommendation of the committee as set forth in the first paragraph of the report, it is merely that a charging plug of large dimensions be standardized and they give those dimensions as the standard dimensions. Now, is there any objection to that particular recommendation?

Mr. Chapin: Yes, sir, because at the present time the large capacity plugs on the market that give the best satisfaction and last the longest, as collected from a source of information that is considered more or less reliable, are the flat surface contacts. It is admitted that the small current carrying plugs that are in use ought to be eliminated. I personally am responsible for charging more than one hundred cars; not every night, but a hundred cars a month. I get all their charging, and from our experience under those conditions we have found that the plain contact is the only one which permits of absolute reliability on a continuously kept record of that reliability. A larger plug is all right, but I would suggest that in the city of Chicago it is up to this garage organization to adopt either an inside or outside polarity. I certainly would hate to see the truck manufacturers today turn in and send out a concentric plug when developments within the next twelve months may show a still better plug.

Mr. Lloyd: Unless my memory is at fault, just one year ago at our convention in Boston there was a resolution passed that a particular plug be adopted as standard. Now, if in the short space of one year we find that that was not a proper resolution or that that resolution was wrong, it seems to me that we ought to be a little cautious before going on record at this convention on something which might again next year have a definite change. That is the reason I made the motion as I did.

Mr. Whitney: Mr. President, I think Mr. Lloyd is mistaken. The recommendation is to adopt a larger plug in addition to the plug which has already been adopted. The pleasure vehicle manufacturers object to the heavier weight of the larger plug, which is entirely consistent on their part, and the small plug is not heavy enough to pass the underwriters' requirements for heavy trucks. The only logical solution is to have two sizes of plugs. In answer to the question brought up by the other gentlemen, I might say that I think the members of this committee are very broad minded if they recommend a standard, and if it is found later that that is a mistake, we can then change it. I will venture the assertion that if we adopt this plug as a standard, we will more than pay for the cost of changing over that might be necessary in less than one year. Now, if we are wrong let us change at the end of the year, but let us get rid of the tremendous confusion that is in existence today. Mr. Whitten's statement as to what we are going to do during this year on some of the other standards might be answered by saying that we don't want every manufacturer to send out a different kind of plug. We want to have something, if it is only a temporary standard that would be arranged for all trucks.

Mr. Conant: It seems to me time for action has arrived. I brought this matter up four years ago at our first convention. I brought it up three years ago. Nothing is accomplished except by action. Therefore, I move you that the motion be amended so that this report will be accepted and filed as recommended practice.

The President: Is that amendment accepted by the original proposer?

Mr. Lloyd: I accept it.

The President: I would just like to say we are all familiar with the work of the Standardization Committee with regard to the charging plug. That has already been standardized and it took about two years to accomplish it. Are you ready for the question? All those in favor of the motion adopting this recommendation will please signify it. The motion is carried. That carries with it all the recommendations made within this committee's report.

Kilowatt-Hour Consumption

There is a great demand by prospective purchasers and owners for information as to the kilowatt-hour consumption per mile for electric trucks of various sizes.

The kilowatt-hour consumption per mile of travel depends upon the type and size of the vehicle, number of miles traveled, conditions of charging, nature of the roads, and the tire equipment.

Definite figures cannot be given as standard, but the following figures can be submitted, which are reports received by the *Electric World* from electric-truck users:

	Kw-hr. per Mile.
1,000-lb. wagon, lead battery	0.69
4,000-lb. truck, lead battery	1.20
1,000-lb. wagon, nickel-iron battery	0.85
500-lb. roadster, nickel-iron	0.70
750-lb. runabout, nickel-iron	0.50
750-lb. roadster, lead cells	0.50
4,000-lb. truck, nickel-iron cells	2.25
3,000-lb. truck, lead cells	1.00
1,000-lb. truck, lead cells	0.54
Average of fifteen vehicles, 750 lb. to 4,000 lb., lead cells.	0.80
Average of five vehicles, 750 lb. to 3,000 lb., lead and nickel-iron	0.60 0.90
Average of four cars, 700 lb. to 7,000 lb., lead cells	2.80
Average of four cars, 700 lb. to 2,000 lb., lead cells, approximately	0.50
Average of thirteen cars, 750 lb. to 4,000 lb., lead and nickel-iron	1.80
Average of 25 cars, 500 lb. to 8,000 lb., lead cells	0.38

Although in no sense comparative, they represent different conditions in remote parts of the country. In general the truck consumption depends on the vicinity traveled. Steep grades, hilly roads, and poorly paved streets are among the many factors which increase the kilowatt-hour consumption.

Mileage Tests

As a test of batteries that have been run 10,000 miles, Ralph Temple drove a Baker electric ninety miles on a single charge. This car, with the same battery, when new, has traveled 121 miles on a single charge. The machine is equipped with the new Baker motor and nonarcing controller for which a saving of 25 per cent of battery consumption is claimed. The Baker Electric Company has for years been improving the efficiency of its machine by mechanical means, so as to enable the car to go further on a single charge of the battery.

The President's Address

To the Convention of the Electric Vehicle Association of America, October 27, 1913

BY ARTHUR WILLIAMS

YOUR Association is three years old. During this period it has grown from an original of twenty-nine to a present membership of four hundred and thirty-nine. This number includes thirty-five electric vehicle manufacturers and sixty-two central stations. New England and Chicago have sections in splendid working condition, New York and Philadelphia have local associations, both doing very active work.

Plans are now under way for the establishment of a section on the Pacific Coast, with headquarters probably at San Francisco. I am informed that very large growth of the industry is promised for that section of the country. It would seem that sections should be formed in every large city, possibly extending to geographic sections corresponding with similar sections of the National Electric Light Association. It is difficult to conceive of any more effective way to carry out the educational work necessary to reach the highest attainable development in the industry. Our membership should eventually include every manufacturer of an electric car, whether designed for business or pleasure, every central station in the country covering a territory where the use of an electric vehicle is a realized or prospective possibility, and, through the local branches, perhaps every user of an electric vehicle.

During the Association's life the field of the electrically propelled car has broadened materially. Two years ago eight or nine manufacturers were represented in New York City; today twenty-one makers have agencies there. A year ago there were not more than twenty manufacturers of electric vehicles in this country; now the number has risen to thirty-seven—a gain of eighty-five percent in twelve months. It is significant that many of the manufacturers of gasoline cars are entering the electric field.

ELECTRIC VEHICLE GROWTH.

According to some statistics recently furnished to me, in Chicago, there are at present thirty-two hundred electric vehicles; in New York City two thousand; in Cleveland 2,000; in Washington nine hundred and nine; in Denver eight hundred and eighty-seven; in Boston five hundred and forty-three; it is estimated that in the country as a whole there is an aggregate of thirty-seven thousand electric vehicles; of this number twenty-five thousand are devoted to pleasure and twelve thousand to business purposes.

In Chicago electric trucking has increased four hundred per cent in two years; in New York City forty per cent of all power vehicles devoted to business are of the electric type. In the latter city power driven electric trucks are now employed in seventy-six different kinds of business.

The United States Navy operates electric trucks on navy docks, partly because of the absence of any fire risk. This is a most important feature wherever trucking is carried on a dock, into a warehouse or to any other premises where the slightest danger of fire exists. Nine of the hospitals in New York City use electric ambulances, and inquiry indicates that the service rendered is most satisfactory. It is clear that horse service possesses no satisfactory comparison whatever with the electric and that power vehicles of any other character are at much disadvantage when placed in contrast with service of this nature. Police patrol wagons and fire engines in our various cities operated by electric motive power give exceptionally satisfactory service. Record has been kept of the operation of an electric fire engine in the city of Brooklyn; the machine went into commission in April, 1912; during its first year it answered three hundred and nineteen alarms; its operating cost was $188.74, compared with $549.28, the former cost of maintaining horses for this service during a corresponding period.

Atlantic Trucks in the Service of Baker's Chocolate.

ELECTRIC ADVANTAGES.

Electric trucks and delivery wagons can do much to relieve congestion upon the streets and at the various terminals of our cities. They occupy less space, move faster and are more easily manipulated. When unloaded less time is taken to get away—perhaps little in individual instances, yet the time saving is enormous in the aggregate.

The losses incidental to traffic and terminal congestion in our larger cities undoubtedly affect materially the cost to the ultimate consumer of everything transported. The solution of this question is one of the important problems of our traffic engineers and this Association.

I am informed that the New England Steamship Company in the city of New York by using electric trucks on its docks is able to handle fifty per cent more tonnage than is handled on nearby docks with much more street frontage. Quite needless to say that any difference in cost must be very large where it involves important realty considerations.

BATTERY IMPROVEMENT.

The use of storage battery cars is increasing rapidly. This is important as showing that the battery itself is improved sufficiently to justify reliance upon it by men whose profession is transportation and to whom a high character of speedy and reliable service is absolutely indispensable in the proper discharge of their obligation to the traveling public. In New York one of the transportation companies is now operating one hundred and twenty battery cars, each with a seating capacity of twenty-eight persons and with the usual additional room for those who unfortunately are compelled to stand during times of heavy traffic congestion.

The average daily travel of each car is between sixty and seventy miles, with an operating cost approximating seven cents a mile, including battery maintenance, oil, grease and mechanical repairs, but exclusive of platform service. The daily average consumption of each car is thirty-five kilowatt hours, which gives an idea of the relative cheapness of this class compared with any other method of transportation upon a city's thoroughfares.

The frequent runs of one of the Healey vehicles between New York and Philadelphia, a distance of about ninety miles; the recent trip of a Bailey car from Boston to New York, at an average speed of more than twenty-one miles, with only two "boosts" on the way, and the start in the last few days of another Bailey electric from New York for Chicago, are further indications of existing and prospective battery capacity of the modern pleasure car. It would seem safe to say that the pleasure branch of the vehicle industry needs only the united support of the central stations to eventually reach that degree of manufacturing magnitude necessary to bring the price within the reach of the public in competition with the lower priced cars of other types.

CAR IMPROVEMENTS.

Each year finds improvements in both types of electric cars—pleasure and business. This advance relates not alone to the better design of the bodies, but to increased simplicity and better construction of the chassis. The application of electric power lends itself to simplicity, economy and efficiency in transportation as it does in every other form of industrial activity. In these respects, which are largely the determining factors, the electrical is not approached by any other method of transmitting or applying power for any purpose whatsoever.

Recent models possess some very desirable safety and efficiency factories. Thus the removal of the controlling switch automatically locks every part. Another excellent feature is the brake control, also automatic, over the connecting rheostat, so exercised that with the gradual holding up of the car the current flow is proportionately lessened, until with the stoppage of the car by the brakes there can be no current flow. This eliminates the waste due to the careless or inefficient driver who, instead of controlling his rheostat by hand and so saving the supply of battery current, prefers to control the movement of the car by the brakes which, while increasing the wear on the car, not only consumes current for no useful purpose, but, with reduced speed, causes an increase in the rate of battery discharge. The application of this feature alone, particularly on business vehicles, should mean a marked increase in battery and transportation efficiency.

ONE SOLUTION OF THE CONGESTION PROBLEM.

The secret of relieving congestion in the business sections of our cities is not, in my judgment, to be found in the construction of elevated or underground streets, but rather in the substitution of night for day trucking. To this change as a traffic rule or development I see no objection whatever. That is to say to the wholesale trucking from terminals to warehouses; to all trucking in large bulk to our large department stores; to the delivery of coal to our large buildings; and other examples where night for day trucking can be substituted will suggest themselves.

The economic advantages to the community will be enormous. Thus the use of the investment in terminals and warehouse plants will be extended over a wider period of the day; the investment in pavements in our larger cities will be given a more extended and, therefore, a better average use. Wear and tear and, therefore, general depreciation upon the transportating vehicles will be greatly lessened through the holding of a straighter course and less frequent stops, many of them made suddenly to avoid collision or injury to pedestrians.

There is nothing in the electric truck which limits its use in the matter of hours. As in many other departments of human activity, employes will quickly become accustomed to the change in hours, and, because of lessened mental concentration and physical effort, they will accomplish the same amount of work with far less fatigue. In the heat of summer both machine and man will work better at night, and at least the human interests are conserved in winter by the lessened time during which for a given amount of transportation the driver will be exposed to the elements.

PROSPECTIVE DEVELOPMENT.

In the development of the electric vehicle industry every central station has an intense interest. Taking the larger cities alone their trackless haulage at as low a figure as two cents a kilowatt represents an annual income of approximately four hundred million dollars. This is not exceeded by the present income from commercial light and power service of all the central stations of the country. If we can find a means to supply electric power for the country and suburbs and thus replace the feed bill of the existing horses and mules the supplying companies' income for electric service, at the same low rate, would materially exceed one billion dollars annually. It does not seem idle to anticipate that the not distant future will find material reduction in the demand for food now required by animals engaged in transportation and that the acreage so relieved can be devoted to the increased productiveness of human food, thus lessening the cost or tending to solve the problems of the future which relate to the productive capacity of our soil in supplying sufficient food for our growing population.

In the interest of itself and the local public it is but fair to say that no central station in this country should use any other means of transportation, excepting under very unusual conditions, than the electric vehicle.

EDUCATION.

Another important problem to solve is the education of drivers and others in charge of vehicles. Compared with other forms of mechanical power far less experience and skill are required for the operation of the electric motor, yet this simple operation should be attended with the skill necessary to keep the apparatus in the most satisfactory conditions. Our Association should endeavor with all means at its disposal to increase the skill with which drivers handle vehicles placed in their charge. One of the plans of the Association is the production of a manual for the guidance of drivers and garage attendants in the maintenance of batteries and motors.

STANDARDIZING.

It is important that manufacturers should standardize all of the connecting parts of vehicles so as to permit charging at any point. This relates to the car whether devoted to business or pleasure. Nothing is more annoying or destructive of charging efficiency than to find a set of connections at a charging point which do not fit. This has been referred to before. Much has been—much is to be — accomplished in this matter of standardization.

AUTOMOBILE SHOWS.

The electrical shows now being given in our larger cities offer an excellent opportunity to introduce the electrically propelled vehicle to the general public. It is hoped that the management of these shows will give the vehicle the prominence in space and advertising which it deserves in recognition of the mutual advantage to be derived to the vehicle and to the central stations. A number of manufacturers still continue to place electric cars in the gasoline shows. The wisdom of this course may be rightly questioned when remembering the entire dissimilarity between the two classes of apparatus and that usually the electric vehicles are crowded into such obscure and out-of-the-way places that the effect upon the public mind cannot be other than very disadvantageous to this important industry. If electric cars are to be in the gasoline shows it would seem that they should be placed there most prominently and featured no less fully than the cars of any other type of manufacture.

The Detroit Electric Limousine.

CO-OPERATIVE ADVERTISING.

The progress of the Association in the matter of co-operative advertising, last year under the chairmanship of Mr. W. W. Freeman, and this year of Mr. Frank W. Smith, has been most gratifying. One cannot be other than pleased to take up the various magazines having national advertising and notice the splendidly effective display that has been secured by our committee. In addition to awakening the public itself to the desirability of this class of car over any other type for most of the purposes for which transportation is required in our larger centers, the advertising has undoubtedly been beneficial in drawing attention to the movement on the part of central station management and suggesting to the manufacturers themselves the desirability of individual advertising on an increased scale.

IMPROVED SERVICE TO THE PUBLIC.

One of the complaints made by manufacturers is the difficulty of securing adequate garage service for electric vehicles. It is reported that to a very large extent the garages where gasoline cars are stored appear to discriminate against the electrics. Possibly this is due to the fact that the electrics call for so much less in the way of repairs and supplies. In any event, whatever may be the cause, the condition seems to exist, to the detriment of the electrical industry.

Effort should be made in every city to encourage the development and convenient location of garages which make a specialty of caring for the electric types. Some of the central stations are now listing and advertising garages of this character. This serves a three-cornered interest—the garages, the central stations and the public owning electric cars.

Another complaint is the difficulty of securing emergency charges when, for one cause or another, the battery supply is seriously reduced or entirely exhausted. In many cities the central stations are themselves providing emergency service plugs and listing them with the garages in a sort of local automobile directory or "Electric Blue Book." Just as gasoline can be obtained at convenient points, so we should all strive to have charging current available to meet any emergency that may arise.

Another aid in the development of our industry is the publication of a local "Blue Book" showing the routes—and on these routes the charging points—which may be conveniently taken for electric touring. Guides of this character can be developed to such a point that they will eventually show the traveling radius of any type of car or battery and the point at which the tourist should replenish his batteries before going on to another charging point. This certainly would be no more difficult of accomplishment than the preparation of many of the guide books one finds, say, in touring such a country as Spain, where each city, town or village is listed as having—or not having—garages, places of tire and automobile supplies and at which gasoline may be obtained. Here is a splendid field for public and industrial service through the automobile departments of our central station members and this Association.

One of the important developments of the year, which, however, was started during the splendid administration of my predecessor, Mr. W. H. Blood, Jr., was the completion of the garage or charging station sign. Those who had opportunity to see it on the "model garage" at the recent New York Electrical Show will be able to better appreciate its character and the amount of thought expended upon its design and manufacture by the committee having charge of the matter. The intent is to place this sign on the garages and charging points of the country which meet the requirements of the Association. It should prove an effective help to both the touring and the business car.

In conclusion, the Association is to be congratulated upon the character of the services it has received during the past year through its office staff. Were it not that they are elected and, therefore, honorary officers, the heartiest congratulations for the character and the time devoted to the work of the Association would have to be extended to the first vice-president, Mr. Frank W. Smith, the treasurer, Mr. Day Baker, and to the secretary, Mr. Harvey Robinson. But as their offices are of this honorary nature they would, perhaps, prefer that no reference be made to the matter, however much it may be justified.

Your committees have done splendid work. We are greatly indebted also to the authors of the important papers presented at this convention and to the local committee through which the plans of the convention were matured.

During the year the office of assistant secretary was created. It has been efficiently and satisfactorily filled by Miss M. C. Johnson.

We are looking forward to a wonderful development in the field the Association is so ably covering—a field of development in which we have as yet hardly scratched beneath the surface.

PRESIDENT'S ADDRESS COMMITTEE REPORT.

Mr. Hayden Eames: The committee recommends that the report be printed. The president has suggested the possibility that it would be desirable to verify the figures he gives in regard to the number of electric vehicles in use in the various cities, and while there is very little doubt that these are accurate, the committee recommends that it be done and that something be said about the number of cars in Cleveland. It was said to be about two thousand electric cars in Cleveland, which would make it about as large a percentage as in any city in the country and therefore would be a good place to watch. There is one other point. The committee particularly calls attention to the president's remarks on the first page in regard to the National Electric Light Association and the advisability of having the district allotments when we come to consider sections of this organization correspond as nearly as possible with that association. I think we sometimes forget that we were originally an outgrowth of that association and are really looking to the members of that association for real assistance. The committee takes this occasion to express its especial appreciation of this report which covers the ground as well as it possibly could be covered.

Car Owners Want Law Amended

One of the serious problems confronting the electric car dealer is the restriction which makes it impossible for women to leave their machines for a longer period than half an hour or an hour in certain parts of Chicago downtown district. The owners of electric cars—and particularly the women who drive their own machines—have appealed to the electric men to use their influence to have the law amended.

Among those who have had requests are D. E. Whipple, manager of the Chicago branch of the Detroit electric; G. H. Pearson of the McDuffee Automobile company; Ralph Temple, of the Baker electric, and Penrose Reed, of the Chicago electric.

The women find it an inconvenience in shopping or making other down town calls to abide by the regulation which requires that the car must not stand in one place longer than the law allows. In regard to the unrestricted district they aver that often it is too far away from their objective point to make it worth while driving their car down town, and that the street car or train is usually more attractive under the circumstances.

Manager Whipple, of the Detroit electric branch, is taking a prominent part in the campaign, and representatives of the electric machine in Chicago are essaying to remedy the condition.

"Daily this matter becomes more of a problem to the men who are selling electric cars," said Mr. Whipple. "We have enlisted the organized motor organizations and representatives of the big State street stores in our movement. The woman who owns or drives an electric cannot argue with a bluecoat as do some owners of gas cars who leave their machines along the curb.

"Time and again the women have appealed to the sellers of electrics to effect some sort of a compromise on a parking district for electrics.

"Several suggestions have been made, including the one to provide for the Garage Owners' Association to have the right to maintain a garage on the lake front somewhere, the city to get the profit. There is much food for thought as to just how it could be worked out, but the fact is patent to every dealer in electrics that women who drive these cars should have convenient places for leaving them while they are shopping."

The Chicago Electric's Brake

A feature which proves of utmost value, safety and comfort to the driver of an electric car, and particularly to women, is the brake as applied and operated in the Chicago electric.

The natural impulse in cases of emergency is to pull the controller lever back, which stops the car almost instantly. This positive method of brake application eliminates the danger resulting from the operator's foot slipping from the brake pedal and failing to stop the car when it is of utmost importance to prevent a serious accident.

Another feature which is greatly appreciated, particularly in the winter time, is that it permits the operators to keep their feet comfortable by protecting them with a blanket or resting them upon a foot warmer instead of forcing them to keep their feet unprotected so as to have instantaneous brake application in emergency.

This brake is not a motor brake, but applies back of the motor and upon the propeller shaft, relieving the motor of any strain.

Great Future in West

T. H. McGiehan, general manager of the Motz Tire and Rubber Company, Akron, Ohio, who has recently returned from a visit to the Pacific Coast, says the West is a wonderful country for the electric. At the present time both the electric pleasure and commercial car hold an eminent position. The excellent roads throughout the Pacific coast, especially California, afford bright prospects for this type of machine. Considering the perfection of good roads, which seems to be the one ambition of the people in this territory, the future of the electric is unlimited.

Not only is the electric pleasure vehicle popular in this section, but also the electric truck. There is a big field for them, and no doubt a year's time will see the present number practically doubled.

The Western states along the Pacific coast raise an enormous quantity of fruit. The rapidity with which these products can be delivered to shipping points by trucks is appreciated by the fruit growers, as they fully realize that their product is one of a perishable nature.

The continuance of the good roads policy is bound to establish this section of the United States as the largest user and possibly producer of electric vehicles.

It seems that many electric pleasure car and truck manufacturers, seeing the great possibilities of the West, have under consideration assembling plants to build their cars in this section.

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CHICAGO, NOVEMBER, 1913

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THE BIGGEST CONVENTION.

When the fourth annual convention of the Electric Vehicle Association of America adjourned Tuesday afternoon, October 28, it closed the largest meeting it has ever held. The registration list, which we publish in this number, shows a total of 345 names; and that means 345 enthusiastic boosters for the electric automobile assembled under one roof.

All trades have their annual conventions; each has its own peculiarities, and a mental comparison of their methods is interesting. Some are mere pleasure junkets. Many are devoted to the bickerings of trade politics. The electric vehicle men proved at their convention that they take their pleasure in their business, and they have no trade politics. Their intense devotion to the subject, their close attendance at every session, their concentrated attention to every paper, every report and every discussion, were really extraordinary, viewed in the light of experience with other lines of industry.

There is, too, a fraternity among the vehicle men and their co-workers in the charging and accessory field that makes business competition secondary and the development of the industry at large the prime factor. That unusual but highly commendible sentiment, of course, accounted in large measure for the success of the fourth annual convention, as it explains the remarkable progress of the association itself.

It is unnecessary to comment upon the accomplishments of the past year, for that subject is ably covered in the address of President Williams, which we publish. Nor is it necessary to repeat here the details of the work so successfully undertaken by the officers and committees of the association, for their reports are printed on another page and show their own inportance. So essential, indeed, to the good of the cause do we regard the dissemination of this information that this issue of Electric Vehicles is practically devoted to convention matters. Even the papers read before the meetings we have held over for another issue, and the usual stories of the trade have been forced to give place to the discussions of matters more immediately vital. For this we feel no apology is necessary.

Every convention is ended with the optimistic but trite observation, "everybody left the meeting imbued with greater enthusiasm and inspired to greater efforts for the coming year," or sentiments to that effect. In many cases this is a mere figure of speech—said because it is the thing to say. Of the electric vehicle meeting it is absolutely true. The latent forces made dynamic by the spirit of the convention will propel the electric vehicle industry toward still greater success until, a year hence, they are reinforced by the fresh enthusiasm of, let us hope, a still greater convention.

COLONEL BAILEY'S RIDE.

From Boston to Chicago in an electric roadster makes a decisive answer to any doubts as to the actual performing ability of the electric. Heretofore, the very suggestion of such a tour would have appeared to many as a wild dream; nevertheless, this run of 1,302.5 miles of actual road course has been covered successfully and under the most discouraging conditions.

To the public at large, the majority of whom are still unacquainted with the electric as other than a city car of small mileage, this tour may seem extraordinary; yet Colonel Bailey in reporting his trip describes the run as a simple matter. If it had not been for the constant rainfall and consequently the poor condition of the roads, the entire trip would have been made without adventure. The detailed account of the run as published on other pages of this issue shows the entire absence of difficulty caused by either the car or its battery. In every instance charging facilities were obtainable in the larger cities, and in the smaller towns central stations were courteous in promoting the necessary means for securing a boost.

The somewhat spectacular trip might at first thought be construed as being promoted purely for the publicity and advertising to be gained; yet Colonel Bailey was the first to state that not only any other driver, but any other good electric roadster, could duplicate it. The real porpose of the run was to interest and to convince the central stations throughout the territory covered, especially the companies in the smaller cities and towns, of the real value and ability of the battery propelled car.

Colonel Bailey frankly states that in the rural districts the central station companies in the majority of cases were entirely uninterested in electric vehicles. Having never before had an actual demonstration, they suddenly became enthusiastic; and in fact, where they were heretofore prejudiced and luke-warm to this type of vehicle, the roadster and its run absolutely converted them and left no room for doubt as to the service rendered.

This run, with the effects of its personal demonstration, has probably done more for the solving of the central station co-operation problem than any other single act or effort. Where charging facilities were not a regular factor in the central station equipment, this tour has brought a realization of the necessity for this service, to be ready at all times.

The experiment has opened up a new and more extensive channel to reach and convince both the public and the central station that the electric vehicle has outgrown whatever limitations it has had or was supposed to have.

BOUQUETS.

THE way of a trade paper publisher is not easy. When one has the temerity to enter a new field uninvited, he usually meets stubborn barriers of indifference, discouragement and even suspicion. He must leave it to time and the efforts of his representatives to convince the trade that his intentions are good; that he is really working, and working hard, for the betterment of the business.

The publishers of Electric Vehicles, therefore, feel particularly grateful for the hand of friendship which has been extended to them practically from the moment of their entrance into this great field, and for the moral support, at least, which has been so generously provided. To us it seems a particularly striking tribute to our efforts to have the chairman of the Chicago section, Homer E. Niesz, g on record in report to the annual convention with the following:

> *Although not directly a result of the activities of this Section, it is, nevertheless, worthy of mention that some of the members of this section have, during the last year, promoted a new magazine entitled* Electric Vehicles, *which is at present the only publication devoted exlusively to the electric vehicle industry. A magazine of this character, well conducted, should appeal to this association as worthy of recognition and support and should be of substantial benefit to the industry.*

And, as if that were not enough honor, to have Chairman Frank W. Smith (now president) reply to Mr. Niesz's report in these words:

> *I would like also to comment with regard to the* Electric Vehicles *magazine which Mr. Niesz mentions in his report. I think that publication should be given the support of this association and the individual members. There are two concrete ways of doing that: First, subscribe to the magazine, which everyone interested in this society should do, and, second support it in its advertising columns.*

Already brought to a high pitch by such praise, our *amour propre* reached its climax when, a few days after the convention, we received the following letter from Treasurer Day Baker:

> *The electric vehicle convention issue of your periodical was certainly one of the best and most educational members that has yet been issued. The large number of articles, profusely illustrated, certainly should prove most conclusive arguments to the prospective purchasers of motor vehicles. I believe that there is nothing more convincing than well-written papers with good accompanying illustrations of vehicles in active service.*
>
> *The vehicle manufacturers and central station interests should, by liberal use of your advertising pages and subscriptions, show their appreciation of your efforts toward the upbuilding of the industry.*

In our modesty, we can only hang our head and, with a becoming blush, stammer, "We did our best." It is but natural, however, that we should feel moved by these encomiums to try with all our might to do even better; not necessarily to win greater praise, but to feel sure we deserve what we already have.

And if, perchance, we should actually secure some of those advertising pages which our eulogists say we deserve—then, indeed, would our cup of joy overflow.

THE USE OF LARGER TIRES.

AUTOMOBILE manufacturers early found it necessary to promote a campaign in order to educate the business man as to the necessity of the electric truck. The success which resulted therefrom represents the constant effort of the manufacturer in teaching the consumer as to the proper method which should be employed to preserve the life of the car, and to obtain a service that is efficient and convincing. However, there is one factor which stands as an obstacle to the consumer. The tire equipment is the one element which figures as an important expense item. The average consumer has made no effort to keep a record of the working capacity of his tires. Tire manufacturers have issued definite instructions and regulations relative to upkeep and maintenance. But such instructions apply only under certain conditions. The tire problem must be solved by the consumer. Every consumer operates his truck under conditions which are peculiar to his own business. Where one type of the tire would be efficient, another type would be entirely unsatisfactory under similar conditions. The tires are usually furnished on a basis of weight to be carried. Seldom are tires in excess of the size to carry the maximum freight. The tires might be expected to afford average service were not the owners always willing to load their vehicles to more than capacity, with rapid deterioration as a result. Larger tires should be used. Of course, they create an additional cost. Nevertheless, with larger tires there is a double assurance in that the life of the tire is much longer, and in the end they will prove to have furnished at a smaller expense a more effective service, with the truck capacity increased.

The sale of larger tires does not benefit the manufacturer; but they mean longer life and a better and cheaper service in the end.

The city of Denver has 852 passenger electric vehicles and 62 electric trucks, making a total of 914 electric vehicles, the count having been taken August 15 of this year.

Legislation, Records, Insurance and Instruction

Committee Reports to the Convention of the Electric Vehicle Association

REPORT OF LEGISLATION COMMITTEE.

During the past year an epidemic of more or less radical legislation affecting motor vehicles seems to have broken out in various sections of the country, the general trend of this legislation being to unduly penalize the automobile by taxation or limitations of various kinds—exorbitant license fees, speed, horsepower rating, weight, load and size of vehicle, etc.—each bill having some peculiar method of applying a special tax to motor-driven vehicles.

The broad question as to whether the automobile should be singled out for special taxation, exempting other vehicular users of the highways, is one that opens up an interesting field for ethical discussion; but it is not the intent of your committee to trespass upon the legal aspect of this situation. It is sufficient to say that there are many and varied laws now on our statute books (and some, it is to be regretted, rather hastily framed), and that any changes or modifications in these laws should be considered of importance and of vital interest to the industry, meriting careful and intelligent consideration from those who have the future of this rapidly expanding industry to consider.

A large portion of this more or less radical legislation came suddenly to light and it became necessary to combat it vigorously.

The E. V. A. was actively represented in this work in Illinois, New York, Massachusetts, Pennsylvania, etc., co-operating with the Automobile Chamber of Commerce, the Motor Truck Club and the Electric Vehicle Club of Boston. All helped to secure the active co-operation of owners throughout the country, and your committee is pleased to report that for the time being at least, the most objectionable features have been removed from the majority of the laws now of record.

The New York *Times* of September 7, 1913, quotes the Hon. Mitchell May, Esq., able Secretary of State for New York, in part as follows:

> The motor vehicle is doing much toward the elimination of state boundaries, yet laws which govern it differ in every state, and every change in any state may cause confusion spreading far beyond state lines.
>
> The creation of just legislation demands careful consideration of the great number of people employed in the automobile industry and the vast amount of capital invested in it. Both those employed in it and those investing in it naturally and excusably regard with jealous eyes any effort to modify existing laws, fearing that such modification may in some way interfere with their interests.
>
> I believe no necessity exists for special local ordinances affecting automobiles.
>
> Co-operation between manufacturers, motorists, and the authorities, along reasonable lines, would solve many problems.

The sentiment of the honorable secretary of state thus expressed, shows a most hopeful condition, and a consideration of the interests of those most vitally affected by vehicle legislation.

While the committee may feel that it is unjust to exempt the horse-drawn vehicle and tax the motor-driven vehicle (which latter makes for cleaner streets, more sanitary operating conditions and more rapid transportation), it cannot but feel that uniform state legislation of a sane and reasonable character is desirable, whether applied equally to all users of the public highways or only to the motor vehicle.

With the object of bringing about uniform state legislation, a committee appointed by Governor Sulzer of New York, is about to begin its efforts, and whether this legislation will eventually apply only to the motor vehicle and exempt the horse-drawn vehicle remains to be seen.

This committee will confer with commissioners to be appointed by the governors of nine different eastern states (and it is hoped ultimately by the federal government), to frame laws which will satisfactorily serve the interests of the state and the public without restricting the utility and economy of the automobile. The committee hopes that the somewhat contradictory laws of the various states may be standardized, and that same regulations in regard to speed limits, taxation and license fees, load to be carried and the general operation of vehicles will be welcomed by manufacturers as well as by the large and rapidly increasing body of owners and users.

The committee desires to assist in bringing about this result, and with the earnest co-operation of those who have the matter at heart, look forward with confidence to a satisfactory solution of this somewhat complex problem, and suggest that this report be fully discussed.

If experience in the past can be taken as a guide, it looks as though future legislation will tend to increase the rate of taxation for automobiles in general, and limit the weight of motor trucks used for business purposes, so that we must be thoroughly prepared to properly combat unreasonable restrictive legislation when it is put forward, and this committee respectfully requests that such instructions as this association may care to give as to the position the committee shall assume with regard to future legislation.

Respectfully submitted—P. D. Wagoner, *Chairman;* W. G. Bee, Charles Blizard, E. W. Curtis, Jr., George H. Kelly, E. S. Mansfield, C. A. Ward, *Committee.*

DISCUSSION.

The President: This is a splendid report and is open for discussion. I suppose the importance of having an organization as a branch of our national organization in every state will suggest itself, if for no other reason than to watch and guide legislation along fair lines, not selfish lines, but lines which are fair to the makers and users and the general public. Dr. Pratt, who represents the Merchants' Association of New York, has been giving a great deal of attention personally and through a committee of the association to the question of transportation. Perhaps we had better go on, as Dr. Pratt apparently is not available, to the next report, the Committee on Operating Records, of which Mr. William P. Kennedy is chairman.

REPORT OF COMMITTEE ON OPERATING RECORDS.

The Committee on Operating Records has had under consideration for some time the preparation of a table which would furnish general information on the operating costs of electric vehicles, in various sizes, to meet the demand which there seems to be for such information.

The table attached has been prepared with this purpose in view, and is submitted for your acceptance.

We have also given consideration to the desirability of a standard form for record keeping of the cost of operation of these vehicles, and submit herewith the attached form, which is particularly simple, but which will provide a record of all the information desirable to verify the cost of electric-vehicle operation.

Respectfully submitted, Wm. P. Kennedy, *Chairman;* E. W. Curtis, Jr.; H. F. Thompson, S. C. Harris, E. F. Phillips, W. L. Case, C. A. White, *Committee.*

DISCUSSION.

Mr. Kennedy: I may say in further explanation of these tables that are presented here, and in view of some friendly comment we have had, there seems to be a necessity, particularly in the Association and in electric light companies, for some concrete explanation of what is the general average cost of operating the electric vehicle. Several of the electric vehicle manufacturers are publishing in their catalogs tables from which the one proposed here is a compromise, taking into consideration the minor variations that exist in the equipment of various manufacturers. In other words, this is a table intended to answer the general question presented by a prospective user, and it is the purpose of the committee to keep it modified from time to time as necessity may demand, or as we receive cooperative advice or instruction from the members of the association. I might point out that since this table was prepared the tire companies have called our attention to the fact that the tire figures here are those that were in existence up to about a year ago, but that since that time there has been a radical reduction in tire prices as well as an extension of the period for which the tires are guaranteed; that is to say, that some of the tire companies now, instead of guaranteeing ten thousand miles on electric vehicles to be consummated within the period of a year, say that the ten thousand miles can be extended to an eighteen months period. It is particularly claimed that on light vehicles tires will last eighteen months. Of course, when it gets to the heavier sized vehicles, where the mileage is low, I should judge the ten thousand miles would be taken within the period of a year, so that, if these tire prices are modified to suit the conditions existing at the moment, there will be some slight modification of the general result.

GENERAL AVERAGE OPERATING COSTS ELECTRIC VEHICLES

BASED UPON FIGURES WHICH ARE AS NEARLY REPRESENTATIVE AS THE VARYING EQUIPMENTS ON THE MARKET AT PRESENT

Capacity	700 lb.		1,000 lb.		2,000 lb.		3,000 lb.		4,000 lb.		7,000 lb.		10,000 lb.	
Approximate price	$1,500		$2,200		$2,600		$3,000		$3,400		$4,000		$4,500	
Fixed Charges														
Interest @ 6%	$90		$132		$156		$180		$204		$240		$270	
Depreciation @ 10%	150		220		260		300		340		400		450	
Fire insurance @ 1%	15		22		26		30		34		40		45	
Liab. insurance	100		100		100		100		100		100		100	
		$355		$474		$542		$610		$678		$780		$865
Maintenance														
Battery upkeep	$170		$180		$200		$240		$285		$365		$415	
Tire upkeep	130		150		180		230		280		400		600	
Mech. parts upkeep	50		60		80		90		100		125		150	
		350		390		460		560		665		890		1,165
Garaging														
Electric power	$120		$140		$170		$240		$300		$360		$400	
Storage and washing	180		180		180		180		180		180		180	
Garage labor	100		120		160		180		200		250		300	
		400		440		510		600		680		790		880
Annual operating cost		$1,105		$1,304		$1,512		$1,770		$2,023		$2,460		$2,910
Daily cost (312 days)		$3.54		$4.18		$4.84		$5.67		$6.48		$7.88		$9.32
Drivers per day		2.00		2.00		2.50		2.50		2.50		3.00		3.00
Total daily cost		$5.54		$6.18		$7.34		$8.17		$8.98		$10.88		$12.32

Edison Battery Equipment will have lower maintenance and higher power consumption than above.
Depreciation @ 10% should provide one complete equipment renewal in ten years, which is not figured in maintenance as above.
Interest should strictly be at 3% as depreciation fund gradually reduces investment.

Now, there is considerable demand that some form of bookkeeping record be determined upon by the Association which could be put into use by our members and recommended for use to those electric vehicle owners who are not yet members, so that records of electric vehicle operation costs might be kept upon a uniform basis, which would have a good deal of mutual advantage to everyone concerned. In the first case, it would bring permanently before the motor vehicle users the fact that electric vehicle costs are low generally; second, it would bring to the actual user and owner of electric truck installations, particularly where he has no gasoline vehicles operating side by side, that the cost of electrics is low. Furthermore, if a uniform system were in vogue it would give one company an opportunity of comparing those records with a standard use by other companies, and by intercommunication mutually advantageous information would be exchanged so that the trend would be to reduce the cost of electric vehicle operation by concentrating upon the best information available. Now to accomplish that work is rather a large problem, because we find, particularly in commercial institutions, that if they are very large they don't want to adopt in their bookkeeping methods the plans which are used elsewhere. They like to put their own stamp on things and do not like to conform to proposed systems of this kind. It will take some little time to get a general agreement upon a standard system of records. What this record really is, is a memorandum furnished presumably to the owner of motor vehicle equipment that he can keep on his desk and fill out from month to month, abstracting the information from his bookkeeping department, no matter what the system employed therein is. In other words, if the Electric Vehicle Association should furnish forms to the owners of large motor truck installations, a little loose-leaf book, that the owner could keep in the pigeon hole of his desk, with a memorandum form here for each of his vehicles, he could fill in those figures. The intention is that this memorandum in its terms shall comply with the table which is published here, so that the owner will have the opportunity of seeing whether his actual costs are on a par with what are considered to be the general average costs. It automatically has the advantage of bringing to the notice of the executive or the owner what the cost of his electric vehicle operation is, so that it has the advantage there over the regular system that might be employed in the bookkeeping department, because the executive never sees that. This is what you might call a summary or abstract memorandum of the annual expense of operating an electric vehicle to be kept available for the man responsible for the property and presumably to be set up in a loose-leaf cover. It is the intention of the committee to prepare other such forms as would go in here for the general purpose of establishing and making prominent the low cost of electric vehicle operation. I might suggest, if such is desirable, that action on the acceptance of this report be postponed so that we may make some slight modifications to comply with the method just mentioned.

Mr. Marsh: I would like to ask Mr. Kennedy whether there is something for current in there.

Mr. Kennedy: I may say that we had a purpose in putting down the line here because there is a good deal of discussion upon that subject and we have put the thing under the title of electric power. As a matter of fact, the current is figured at four cents a kilowatt hour. I have always been of the opinion that it is desirable to set forth in these tables the actual cost per kilowatt hour at which the current consumption is figured, but it gives rise to a good deal of agitation, and I in my work have usually adopted the term three cents per kilowatt hour because three cents is an easy fundamental to work with. Some places they have to pay six cents, and that would simply mean doubling the cost. In other cases, in industrial institutions where they have their own power plant, they generally regard the cost of current as a cent and a half, therefore the use of the three-cent figure would furnish an easy means of dividing the current cost per annum. If it were four and a half cents, fifty per cent would have to be added. But the committee thought it would be desirable, in view of the agitation that has been evident concerning the rate at which current is purchased, to avoid putting in the rate. For this reason anyone who will analyze, even as it is apparent in this table, the relative cost of current as compared with all of the other items in the up-keep cost of the annual operating cost, will see it is not such a very important thing as some people imagine it is. If the general cost of furnishing current goes down all over the country it is the intention of the committee to modify the figures without putting in the rate. It would be very difficult to put in figures which would apply to every part of the country, and in preparing this table we had the extensive employment of it in view throughout the country among the central stations, etc.

Mr. Carle: Several people I have talked with stated that the cost of current only amounted to about ten per cent of the cost of operating the vehicle. Do you think that would be a safe figure?

Mr. Kennedy: Why, yes. I think Mr. Thompson presented an analysis at some of our previous meetings in which he showed the current cost is six cents, depending upon the size of the vehicle.

Mr. Thompson: I think an analysis of the figures as prepared by the committee will show that this ten per cent will hold pretty true throughout the table. It varies with the size of the vehicle and also the installation. For instance, the four-cent rate on one car might be correct, whereas in an installation of twenty or thirty cars a cent or a cent and a half might be the figure. It has occurred to me, possibly as a suggestion to the committee, that tabulation be made for installations of increasing size in multiples of five or ten which would show the decrease in current rate due to the increased consumption, and also the decrease in calculation charges through the increase in number of vehicles and consequent overhead decrease per vehicle.

ANNUAL EXPENSE ACCOUNT FOR ELECTRIC TRUCK No.

MONTHS OF FISCAL YEAR		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	Totals	Totals
MONTH OF															
FIXED CHARGES	Interest														
	Amortization														
	Insurance														
	Licenses, etc.														$
MAINTENANCE	Tires														
	Batteries														
	Mech. Parts; Materials and Labor														$
OPERATION	Storage and Washing														
	Garage Labor														
	Electric Power														
	Miscellaneous														
	Other Material Purchased														
	Drivers and Helpers Pay Roll														
	Expense for Other Service when Cars are out of Commission														$
														TOTAL	$

Standard Form for Record Keeping of the Cost of Operation of Electric Vehicles.

Mr. J. A. Hunnewell: Mr. President, I would like to ask what mileage these costs have been based upon for each machine.

Mr. Kennedy: We based the figures upon the capacity of the vehicle at one charge, that is, the maximum capacity of the vehicle. If we assumed any specific mileage we would have a good deal of adverse criticism. This is the cost at which the total capacity of the vehicle per day can be secured, and if the total capacity in mileage is not secured these costs will be affected only in a minor way. You see the committee has provided something that will be a compromise upon the exact requirements for each individual and that which will apply universally.

Mr. Mansfield: Mr. President, I would like to ask Mr. Kennedy if this report is based on the owner taking care of his own machines or a public garage.

Mr. Kennedy: You will notice, Mr. Mansfield, that under garaging we have separated those items. We have put in three items: electric power, storage, washing and garage labor. Now it is presumed, if you consider the care of the electric vehicle at public garages, we would have a different table from that which would apply to the case where the owner garages the vehicle himself. So this is a compromise again. In the charges under the sub-heading of "garages" we have put in a figure of fifteen dollars a month to take care of the keeping of the car in storage, and perhaps the washing, which is a minor thing, and then in addition we have added electric power in proportion to the size of the vehicle, the garage labor varying slightly in accordance with the power capacity of the vehicle. In other words, while these figures here may not be in exact accordance with garage rates, they may be considered safe as a general thing, and while having that very thing under consideration we had to bear in mind that the cost of garaging electric vehicles is very much higher, for instance in New York, than it would be in Kansas City or in Indianapolis, although it has been said that perhaps fifty per cent of the electric vehicles are in use in New York, and that therefore the garaging costs of New York should be used as fundamentals, with the purpose of having the party interested in finding the cost of operating vehicles to get the maximum cost, the plan to see what is the cost of garaging in the city which has fifty per cent of the electric vehicles in use. It is very likely that you would be able to garage for less if you lived in a small city.

Mr. Mansfield: On that second garage item, storing and washing, I see there is a charge of one hundred eighty dollars for each size from seven hundred pounds to five tons.

Mr. Kennedy: That is about fifteen dollars a month, Mr. Mansfield.

Mr. Mansfield: It seems to me that a five-ton truck, taking up more space than a seven hundred pound wagon, ought to have a higher charge for garage space. It also costs more to wash a five-ton truck of the same type than it does a seven hundred pound wagon, and also I think I could make a suggestion: It seems to me that if these are average figures we really ought to have the standard of the type for which these figures apply. In other words, if a two thousand pound truck has a large battery the cost of upkeep necessarily would be more than for a smaller size. If you were to specify the standard on which these are based, it seems to me we could then reckon our figures more easily. In connection with this, I should like to say that some figures were gotten out by the Massachusetts Institute of Technology research department of the Edison Company of Boston. They were specific figures taken from actual observations. It might be that these were taken into account in working this up, but I should suppose that those figures would really mean more than the average, unless we know what they are based on.

Mr. Kennedy: Mr. Mansfield has just read stories on some of the points which have been agitating the committee and made us conclude that it would be extremely difficult to use a precise method in this table, and what we want is really a compromise that will apply. Now, if we were to show here the difference for storage depending upon the floor space occupied by the various trucks, we would have a good deal of adverse contention about it in places where they had a straight storage flat rate, as in minor cities. I think that with regard to the capacity of the vehicle, it is pretty well stated at the top of the table by stipulating the capacity of the vehicle and the average cost, and these are the standard vehicles that are on the market. In fact, the table is a compromise of tables that are in use by the various manufacturers, so that we are not making any radical departure in offering this table to the Electric Vehicle Association and more widespread application. We all understand that the capacity of the vehicle can be increased or decreased by modification or addition to the battery equipment, but this is the standard catalog rating.

Mr. W. H. Conant: It seems to me that the trend of this discussion all leads to the suggestion that notes be added to this table amplifying it somewhat, even as you have done in one or two cases below. If the basis of the figures could be given in the notes it would answer all these questions and at the same time answer the questions of those who consider this table later on for their information. I think practically every question that has been asked is an interesting and leading one that would further enhance the value of the report when finally submitted.

Mr. Kennedy: I think Mr. Conant's suggestion a very wise one and we will probably prepare the explanation. I would remark, however, Mr. Conant, that the difficulty of offering a general table like this and then giving a specific basis in each instance for the foundation of the figures gives rise to a great deal of useless criticism and correspondence. We want the thing regarded liberally and as a first step forward. The committee hopes to do a good deal better work than this, but we have taken a step. We don't want to have to be too exact, too precise.

Mr. Conant: The point I want to make is that if you give the measure that you use in determining these results it enables others to understand the results given.

Mr. Day Baker: In regard to the question of the cost of current per kilowatt hour, I think a great many of us spend a great deal of useless time in discussing that for this reason: In my experience I have found that after a man has used an electric vehicle a year I never hear any complaint from him as to the amount of his current bill or the price per kilowatt. As a usual thing, I have found in various cities that as soon as electric vehicles are introduced the central station meets the requirement and the price per kilowatt is arranged on such basis that the customer is satisfied, and the cost of electricity is seldom considered by a purchaser after he has used a machine a year.

Mr. C. F. Smith: Mr. President, I want to ask if it is proper at this time to discuss the figures in this report, or are we simply discussing the form or method?

The President: We have been handling the subjects before the convention so efficiently that the chair hasn't thought it desirable to limit the field of discussion. I think, however, we shall soon have to pass on to the next report. I don't see any reason why you shouldn't ask any question that you would like to have answered.

Mr. C. F. Smith: I would like to ask Mr. Kennedy if in these modifications he expects to make of tire figures he expects the figure will be less or greater.

Mr. Kennedy: Less, Mr. Smith. I have a table brought up to date, as a matter of fact, and I can answer any particular change in any particular item.

Mr. C. F. Smith: I don't want to disappoint you, Mr. Kennedy, but I want to give you a copy of the records of tires since the first of January showing a comparison between old tire costs and modern tire costs. It is quite lengthy, but there is some information and it all indicates that figures are going up.

Mr. Kennedy: Do you intend the committee shall have this for digestion and application to the table if desirable?

Mr. C. F. Smith: Well, I think it is foreign to the subject.

The President: Wouldn't it be well to bring that up on the subject of the electric commercial vehicle tire tomorrow afternoon? I should think that would be more appropriate as part of that paper. Is there any further discussion on this?

Mr. G. H. Jones: We here in Chicago have realized for a long time the need of reliable data, the actual operating data of electric vehicles. About a month ago the matter was brought before the meeting of our Chicago section and it was concluded it would be very desirable if the association could issue regularly a loose-leaf data sheet which could be bound in a binder somewhat on the plan of the National Electric Light Association that we have had for about a year, and give actual data on installations that are known throughout the country. There has been so much misinformation and lack of information that we really need something of that kind. Therefore, if it is in order at this time, I should like to make a motion that this committee prepare some sort of a form; they can take some one particular installation, and give us actual operating data. It would be the most valuable thing we can do. I think that is a motion.

Mr. Kennedy: May I say a word? I might point out some of the difficulties and disadvantages of carrying that into effect.

The President: Mr. Kennedy, I don't think the motion would be quite in order on this report. This is the report of the committee on operating records. Now, it seems to me that the suggestion of Mr. Jones is an excellent one, but the motion would hardly come up, nor would the scope of the present committee be that of furnishing detailed operating costs. I understand the work of this committee was to give us a basis for record. It that right, Mr. Kennedy?

Mr. Kennedy: Yes.

The President: The motion of Mr. Jones, it seems to me, should come up during this convention, and either this committee's scope be extended or a new committee appointed for the very purpose of work being carried out along parallel lines with the data work of the National Electric Light Association. I think I shall have to ask you to bring the discussion to a close very shortly, or we will not get through with our program this morning.

Mr. Kennedy: May I say a few words?

The President: Yes.

Mr. Kennedy: I would like to have Mr. Jones's opinion on my remarks as to his suggestion. I myself have found, and I think other members of the committee that have been engaged in the preparation of costs upon somewhat similar plans as suggested have found that if we take a specific case and use the figures in that case, very few people, even in the same line of business, will regard them as sufficient evidence to be satisfied with. Furthermore, I don't know what the reason is exactly, but there is considerable reticence on the part of electric vehicle owners to give any data that could be considered as authentic and exact. They won't even endorse a set of figures which would be prepared by competent parties as to the probable cost of their specific installation. A great many instances might be cited. I had a case myself where I wanted to learn of someone operating a certain sized truck and what it was costing him. I went to the electric light company, and I said, "For the good of the industry, will you give me some accurate data that I could go to these people and say, 'Here is an actual case in your city'? That is what was asked of me." The man knew I couldn't do it in advance, that I wouldn't get it for him. I told him this was the cost according to the best knowledge of those people that were most competent to pass judgment. He wouldn't believe that and said, "If you bring to me the man operating that truck I will believe him." I only point that out to indicate some of the difficulties. while I recognize that if we had a common collection of this sort of information it would be very valuable. Even then, though, John Smith, in the dry goods business on this side of the street, might object to the cost of Bill Brown's business on the other side of the street, because Bill Brown has a C. O. D. business and John Smith has a cash business. Consequently, the delay in the C. O. D. deliveries would be very much greater than in the cash business, and he would say that the figures wouldn't apply. Yet if we could get a lot of these figures we could accomplish the same purpose, and that is something we are mutually interested in.

Mr. J. S. Codman: I would like to ask Mr. Kennedy if he will tell us a little more about the depreciation and upkeep charge. What I want specifically is the renewal cost of the batteries and the tires under depreciation or under upkeep, or is it divided between them?

Mr. Kennedy: You will note, Mr. Codman, that there is a foot note to that, and the scheme set forth here in this table was adopted as perhaps the best compromise again. If you will notice, in the table we call it depreciation and in the record form it is called amortization, and some people have objected to the latter term, although it is a more correct term intrinsically than depreciation. But when in approaching the prosective user or purchaser of electric vehicles the question of depreciation comes up, it is very difficult to try to put through any other plan or representation to him than one which wipes out the complete investment in a definite time. If you do that and adopt, as we have here, ten per cent depreciation on the total investment in the equipment, then you should, properly speaking, assume that that depreciation further replaces in the ten-year period one battery, one set of tires, one complete set of working parts, so that the cost then—say the vehicle used a set of tires every year—the cost of the ten-year period would be nine sets of tires, and we would have to take nine sets of tires and divide by ten to get the yearly cost. The same thing would apply to the battery; presuming the battery wore out every year, or even wore out every two years, probably put in four sets of batteries, four set of plates for the ten-year period and make a corresponding modification in this. Because of doing that, and for the purpose of meeting what we believe to be a general acceptance of that thing, we have put in ten per cent depreciation, wiping out the entire investment in ten years, and we have called attention in the note here that that depreciation of ten per cent should provide for complete equipment renewal in ten years. In other words, anyone who objects to the ten per cent scheme employed here has evidence that we recognize that we have put in one set of tires, if a set of tires wears out in a year, and one set of batteries, if it wears out in a year, and so on. In other words, we desire to separate the working parts of the vehicle, or separate those parts maintained, and not consider you have made an investment in anything except the bare shell of the vehicle and constantly keeping the working parts renewed. The average business man, and particularly the auditor, won't agree to that. He wants to treat the depreciation on his automobile in a similar manner to any other thing in which his organization is interested.

Mr. Hunnewell: I have checked up the operation of a one thousand pound machine that we have operated for twenty-four months on a basis of four cents per kilowatt hour for current, and find that the cost per annum is approximately twelve hundred dollars against Mr. Kennedy's estimate of thirteen hundred dollars. I have checked up in a similar manner the cost of operating our three thousand pound machine for a like period and find that the annual cost of operating is fourteen hundred dollars against seventeen hundred dollars. We depreciate our machines, our batteries completely on a period of eight years, representing the cost of operating those two machines. During the next seven years it may be slightly higher. I thought this information might be of interest to show that the figures Mr. Kennedy has submitted are conservative.

Mr. Thompson: If I may venture a few more remarks on this tabulation, I do not think that the intention of the committee in preparing this table was to specifically state that a certain size of vehicle would cost so much annually or so much daily to run, but to furnish these figures as "bogie," if I may use it here. In other words, a thousand pound machine can be operated for $1,304 a year—under good operation the cost should be less, under poor operation it may be more. The figures are probably conservative. But, as I say, the table is simply, as I understand, presented as an indication of the probable operating cost.

The President: We are greatly indebted to the committee for this report. I suppose the question of cost is one that will recur right through the convention. I think, unless there is something rather special now, we shall have to end the discussion on this report and proceed to the next one. Does anyone else wish to speak or ask questions?

Mr. Kennedy: If you will suspend the acceptance of this report until a subsequent meeting, the committee will be able to present a revised report.

The President: A motion to accept the report is in order.

Mr. Hunnewell: I move the report be accepted per the modification.

Mr. Kennedy: I would like to have you suspend the acceptance of it until a subsequent meeting.

Mr. Hunnewell: I accept the amendment.

The President: There is just one thing that occurs to me, and that is if you depreciate the total cost of the machine over a ten-year period under an annuity table of say five or six per cent, you get the exact figure, which will give you very much less than your present method. That is to say, you have taken sixteen per cent flat interest and depreciation, and if you take an annuity table, so that at the end of ten years it would have the same amount plus interest of five or six per cent, you would get a very exact figure and it might be worded or amended in that respect. It is simply giving you the benefit of compound interest.

REPORT OF COMMITTEE ON INSURANCE.

During the preceding year, the Committee on Insurance was successful in securing a 10 per cent deferential rate on liability insurance in favor of electric vehicles over other forms of motor-driven cars. This rate has been almost universally adopted, and is known as the conference rate.

The Committee on Insurance took up, during the past year, the further reduction in liability insurance rates, as applied to electric vehicles. We were successful in securing from one of the best New England companies a further reduction, which amounts to practically a 10 per cent reduction from the so-called conference rate, or practically 20 per cent from the standard rates for gasoline-driven automobiles and trucks. The two letters are self explanatory.

Corwin McDowell, Esq., President, New England Casualty Co., 4 Liberty Sq., Boston, Mass.

Subject: Reduction in rates Casualty Insurance for Electric Vehicles.

Dear Sir: Referring again to my many interviews and the reports submitted on the subject of a favorable deferential rate for Casualty Insurance on Electric Vehicles, I am pleased to state that I have again been named by the president of the Electric Vehicle Association of America, as chairman of the Committee on Insurance.

In that capacity I would like to call your attention to the very favorable returns received to our canvass of liability losses, and to request your board to consider these returns, and the mechanical conditions which exist only in the electric vehicle, making it a preferred risk.

In consideration of all the facts that have been presented, I would again request that you give the Electric Vehicle Association of America an opportunity to announce a greater deferential rate than existing at present, favorable to the electric vehicle.

Trusting for an early response on the part of your company, I am,

Yours truly,
Day Baker, *Chairman Committee on Insurance.*
November 18, 1913.

Boston, Mass., *January 6, 1913.*

Mr. Day Baker, Chairman of Insurance Committee, Electric Vehicle Association of America, 34 State St., Boston, Mass.

Dear Sir: Answering your esteemed favor of November 18, 1912, relative to a further reduction in casualty rates for electric vehicles, I am pleased to state that after a careful and exhaustive study of the additional data and statistics furnished our actuary by you as chairman of the Insurance Committee, we have decided to grant further concessions favorable to the electric vehicles. In some localities our new rates for electric vehicles are 20 per cent lower than the prevailing rate which most companies are charging for gasoline cars.

I believe our action in this matter will be satisfactory to the Electric Vehicle Association of America, and we will hope to have your co-operation in securing the liability insurance for electric vehicles throughout the country.

Yours truly,
New England Casualty Company,
By Corwin McDowell, *President.*

Users of electric vehicles, manufacturers, dealers and central stations should endeavor to take advantage of the favorable rates offered by the New England Casualty Company not only on account of the saving made, but by the volume of business show the appreciation of the Association to the insurance people who have recognized the claims of the electric vehicle in such substantial manner.

Respectfully submitted, Day Baker, *Chairman;* O. B. Henderson, W. P. Kennedy, H. H. Rice, *Committee on Insurance.*

DISCUSSION.

Mr. Day Baker: I might say that the New England Casualty Company, to whom this letter was written and from whom the letter was received, is made up in great measure of people who are interested in electrical propositions in New England, and therefore they were extremely interested in the proposition of insurance for the electric vehicle. There is one thing I would like to say in connection with this report, and that is in going through the records of the various companies, the electric light companies and gas companies and those who are using the vehicles, we found that many of the companies are rating their wagons as emergency wagons. As emergency wagons they have to pay a pretty high premium, and we have found that, as a matter of fact, many of these wagons were not emergency wagons but were merely service wagons. Therefore a great many people are paying insurance on emergency wagons which they should not pay. They should only pay for service wagons, and the insurance companies are willing to take up with anyone the question of the service of the wagon. Many of the wagons which are marked emergency wagons and are really emergency wagons never run at excessive speeds, and the insurance companies in and around New England have expressed an idea that vehicles not running over fourteen miles an hour should not be classed as emergency wagons, but wagons which run from fourteen to twenty-five miles an hour would come under the head of emergency wagons. I think that all electric light companies ought to take notice of that and not register wagons which are not high speed wagons as emergency wagons.

The President: The work of this committee cannot be other than of the greatest advantage, first to the vehicle industry itself in showing that enormous differentiation between the electric and the gasoline cars, which I think is an advertising advantage of no small value, but also in reducing the insurance rates to the users, especially the central stations. Now, I should say that that one factor alone would justify a great many memberships in the association.

Mr. Marsh: I would like to add one word about Mr. Day Baker's report on insurance. If any insurance companies are willing to make a twenty per cent less fee for the electric wagon than they are for the gasoline wagon, it seems to me that there would be a twenty per cent greater factor of reliability in the electric as compared with the gasoline wagon. That would be a point to duly consider, a great point for the salesman. While I heartily concur with you on the advertising value of that twenty per cent, I think that also is a wonderful selling value for the salesman.

The President: The report of the Committee on Papers is to be presented by the chairman, Mr. Stephen G. Thompson. I want to express to him our great pleasure, and I know I express your own feeling in the matter, that Mr. Thompson is able to be with us after a period of very severe illness.

REPORT OF COMMITTEE ON PAPERS.

THE Committee on Papers begs to submit to the members of the Association in convention a report of its work since the annual convention of the Association, held in Boston, Mass., on October 8 and 9, 1912.

In preparing the program for the season's work, the committee endeavored to secure papers touching upon the electric vehicle, as viewed by the different interests affected by the operation of these machines; namely, the "Central Station," the "Electric Vehicle Manufacturer," the "Consumer," the "Operator," and the "Community."

Papers presented covering these phases of vehicle introduction were as follows:

BENEFICIARY.	TITLE.	AUTHOR.	DATE PRESENTED. 1912
"Central Station."	"Central Station Influence on the Electric Vehicle Industry."	Stephen G. Thompson.	Dec. 17
			1913
"The Vehicle Manufacturer."	"Relative Importance of the Electric Truck as Compared with other Classes of the Central Station Business."	H. W. Hillman.	Jan. 21
"The Consumer."	"Observations on Horse and Motor Trucking."	Harold Pender and H. F. Thomson.	Mar. 25
"The Operator."	"Why Teamsters and Carriage Drivers of Today Absolutely Believe in the Necessity of the Motor Vehicle."	Daniel J. Tobin.	April 22
"The Community."	"The Value of Power Wagon Operation to the Community."	F. J. Ryan.	Sept. 23

Many of the above papers were illustrated with lantern slides, and interesting discussions followed. Other papers presented were as follows:

TITLE.	AUTHOR.	DATE PRESENTED.
"The Philadelphia Thin Plate Battery."	James M. Skinner.	Feb. 25, 1913
"Electric Garage Equipment and Management."	H. M. Martin	May 27, 1913

A paper entitled "The Electric Vehicle," by Stephen G. Thompson, was sent by the committee to the Canadian Electrical Association, Toronto, Canada, for presentation at its annual convention, in Toronto, on June 25, 26 and 27, 1913.

The Papers Committee of 1912 made a very commendable suggestion that, so far as might be possible, authors be secured and assignment of subjects made at least six months in advance of the meetings designated, and that all possible publicity be given these meetings.

It has been the endeavor of the Papers Committee to pursue this policy, and it is also its regret that such procedure was found impossible.

In conclusion, the committee desires to express its appreciation for the hearty co-operation on the part of the membership in general, particularly to those who have prepared and presented papers, to the members who have taken part in the discussions, and, finally, to the officials of the Association for their uniform courtesy and consideration.

Respectfully submitted, Stephen G. Thompson, *Chairman;* Frank W. Smith, William P. Kennedy, E. W. Curtis, Jr., H. C. Cushing, Jr., *Committee.*

REPORT OF THE COMMITTEE ON THE ESTABLISHMENT OF COURSES OF INSTRUCTION IN ELECTRIC VEHICLE PRACTICE.

AS a part of this report, it seems advisable to review briefly the report made by this committee one year ago, in order that the particular work and aims of the committee be clearly understood.

In Boston, last year, the following paper was presented.

> The need of better trained and more dependable men for electric vehicle garage work as generally applied to the industry was responsible for the suggestion some months ago to the president of the Electric Vehicle Association of America, that this association endeavor to find relief for that situation.
>
> Practically all the men engaged in that work today have been educated in the school of experience, and, while many have received technical training, most of them are without this advantage, and a great many lack the scientific and technical knowledge necessary in battery and motor work. The lack of sufficient training has been evident to all electric manufacturers and electric garage proprietors in the numerous cases of ruined batteries and repair work unsatisfactorily done which has come to their attention through complaints of customers. This situation is not only annoying to those concerned, but it is detrimental to the growth of the electric automobile industry. The committee appointed for the purpose of establishing courses of instruction in electric vehicle practice naturally turned its attention to the colleges. Instances of college men having spent time in electric automobile factories after completing college courses, and then engaging in electric garage work, were considered. It was found that in many cases these college men, after having completed high school and college courses, had spent so much time and money in preparing themselves for this work that they were not satisfied with four years' experience in practical garage work.
>
> The committee's attention was attracted to the technical high schools now being established in several of the large cities. High school boys seemed to be promising material because they came mostly from good families, have good habits and are ambitious. They, moreover, would be pretty certain to be satisfied with from sixty to eighty dollars per month salary immediately after finishing the high school course at the age of about eighteen years. The subject was presented to the principals of the two technical high schools of Cleveland, Ohio, and, after careful consideration, the West Technical High School of Cleveland, Ohio, undoubtedly the largest school of its kind in the United States, and one just recently completed, decided to establish a course in electric vehicle practice.

During this past summer one of the instructors in that school has been actively employed in one of the large electric automobile factories in Cleveland for the purpose of thoroughly familiarizing himself with the construction of electrics, and a special study has been made of repair and adjustment problems. He has learned how to diagnose ailments of electric vehicles and how to correct the same, a most important work in electric garages. It is the technical school's intention to have this man perfect himself by continued research in electric automobile factories and battery factories and depots.

The electric automobile factory in question is fathering and encouraging this idea with the belief that the boys who complete this course will be material not only for garage work, but also for workmen in the electric automobile factories. Some of these boys who have the proper qualifications and tendencies will be good material for electric automobile salesmen. At the proper time a complete chassis will be loaned to this school and, no doubt, the battery companies will be glad to contribute specimens of their product for practical investigation and study. One of the large battery companies has offered to supply instructors to give illustrated lectures at the proper time. The technical courses, like regular high school courses, begin after the students have passed through the primary schools. Before reaching that part of the course actually applying to electric automobile practice, the boys will have two years of mathematics. three years of English, one year of pattern work, one-half year each of blacksmithing and cabinet work, one-half year of machine work, three years of mechanical drawing and three years of science. The science work will include one year of industrial geography, in which study is made of manufacture transportation problems, weather conditions, grouping of manufacturers, the production and carrying of raw materials, one year of chemistry, in which the chemistry of iron and steel is considered, and one year of physics devoted largely to electricity and machines.

After completing the fundamental studies, the actual study of electric automobile work will begin, and comprise a study of storage battery work, charging and discharging, and the repair and care of the batteries. The course in detail will consist of the following: Taking chassis apart and assembling, adjustment of different mechanical parts applying to both shaft and chain-drive electrics, studying the differential, silent chain, etc.; wiring diagram of motor, control and entire car; detail study of the motor, steel coils, commutator, brushes, etc., proper operation of the car under carrying conditions, as well as locating and remedying of troubles. Some of the foundation studies included in this course may seem irrelevant to those of strong practical tendencies, but it must be borne in mind that these young men will only be about eighteen years old when they complete the course, and that such studies are especially intended for training and broadening influences which shall result in the finished student having brains that are worth while employing.

It has been thought wise to begin and to test the practicability of this course in Cleveland, where there are several large electric automobile factories and a few important battery depots. Cleveland also possesses advantages, in that electric automobiles are especially popular among its citizens, several thousand being in use, and, moreover, that city is centrally located, therefore is a good distributing point for young men trained in electric automobile work.

This report is submitted for the consideration of the members of the Electric Vehicle Association of America, with the hope that criticisms and suggestions may be offered which will be helpful to the members of this committee in carrying out the work of successfully establishing courses of education in electric vehicle practice.

During the past year, there has been little for the committee to do, except to await developments. It seemed advisable to ascertain the most practicable means of educating men for electric garage positions before recommending the course to other educational institutions. Professor Short, of the West Technical High School, of Cleveland, Ohio, has shown great interest in the course, and has carefully experimented for the purpose of formulating the best lines of investigation and study. He recently reported to the chairman of this committee that the course in electric vehicle work had proven the most popular among their several courses which are intended to educate patternmakers, chemists, draftsmen, machinists, electrical workers and agriculturists.

During the year, a manufacturer of batteries has supplied experimental material and an instructor to lecture occasionally. One manufacturer of electrics, in Cleveland, has loaned a complete chassis, which the young men have studied and worked upon, by taking apart and reassembling it. The Technical High School boys who have entered this course take great interest in it. During the coming year it is planned to take the class on trips through the electric vehicle factories and possibly through battery depots and factories. The work at the West Technical High School has been handicapped on account of last year being its first. As the electric vehicle course is not entered into until the third year, there were not many boys in the school prepared to take up the course. Had the school been longer established, the course would have been a better trial last year. The committees and the instructors, however, have seen sufficient favorable results to believe that the Technical High School is the proper place for such a course and are quite gratified over the outcome of their plans.

The next move of the committee will, doubtless, be to endeavor to have technical high schools in other cities establish their course in electric vehicle work. The demand for young men educated in this work is not sufficiently broad to have schools, in general, teach this course. It seems wise to confine it to those cities where electric automobile factories are located. The technical high schools in Chicago and Detroit, therefore, will next be approached.

In Cleveland, it has been learned that night classes at the Technical High School are well attended. The men constitute those who desire to improve themselves in the particular work in which they are engaged. Of all the studies taught, those pertaining to electrical work have the largest attendance of students. This tendency is favorable to the electric automobile industry, in a general way, and should result in a higher standard of workmen in the electric automobile factories. The factories will benefit more from the night classes than the garages, because the studies pursued by night classes must, necessarily, be independent and without place in a definite course of education. The day classes devote their time to studies comprising a four-year course and the students are preparing themselves to become competent in a definite trade or line of work.

The suggestion has been made that a course in electric vehicle practice be introduced in the Young Men's Christian Association's department of instruction. Doubtless, these associations accomplish good results where the instruction is along lines not requiring equipment. It is feared that the men who study in the Y. M. C. A. classes could not be as thoroughly trained as those who take the Technical High School course.

The use of electric pleasure vehicles appears to be growing faster than garage facilities for giving ordinary service to electric owners. Dealers appear to be ready to employ good men, if they can find them, and as the popularity of the electric vehicle, to a large extent, is governed by the satisfaction received by owners, it is strongly apparent that the service end of this industry must be greatly strengthened, in order not to impair the healthy growth with which the electric vehicle industry is now being favored.

When this course becomes thoroughly established in a few technical high schools, and as classes are about to graduate, it is the aim of the committee to offer the services of these young men to the various electric automobile manufacturers, who, in turn, can supply them to their respective dealers who may be in need of the services of such men.

At the next convention of the Electric Vehicle Association of America, the committee for the establishment of courses in electric vehicle work hopes to report progress that assures this educational work as a permanent institution in the electric vehicle industry.

Respectfully submitted, Wm. G. Pancoast, *Chairman;* Charles Blizard, P. D. Wagoner, E. R. Whitney, R. E. Russell, W. G. Bee, *Committee.*

DISCUSSION.

Mr. Jackson (Denver): Relative to this report on instruction in electric vehicle practice, I would like to inquire if this committee had considered the advisability of instituting the course through this Association. The other organizations of the central station, such as the N. E. L. A. and the National Commercial Gas Association, have gotten out courses in salesmanship and study along those lines. Now, I am wondering if anything has been investigated along these lines through this organization. In Denver the central station has had to create a department in order to get service out of the garages for the vehicle owners on account of the low degree of intelligence. The poor battery work and the lack of intelligent and efficient charging have interfered with the progress of the industry. Now, I might mention along in speaking about getting college men at low salaries, I might say that the Dougherty Company, to which the Denver Company belongs, sends fifty college men into Denver every July graduated from colleges. They are signed up for fifty dollars a month for the first year and sixty dollars a month for the second year. Then, if they prove good men, they are given good positions. That point brings out the fact that if any of the college men desire to pursue the occupation of storage battery vehicle engineer they are certainly making a start, at a low figure, as the training is in front of them. Through our company, the central station, we put them through every department. They pass through my department of electric vehicles and storage batteries and it is the department that they are most interested in. I have more time to give to these college men along storage battery and vehicle lines than any other department is requested to give. That is an indication of the trend of the minds of college men that are taken into the Dougherty organization. We take in fifty a year and we train them along all lines and they are sent to the different properties all over the country owned by that syndicate, and if there have been any steps taken toward a course on battery and vehicle work through this organization I would like to know what has happened.

Mr. Blizard: I would say in reply that the scope of this committee's work as laid out for the committee when it was first appointed was the training, not of salesmen, not of men who should sell the car, but of men who should take care of it, and as the committee has stated in its report, here it has laid out its work along those lines, with the expectation that a certain percentage of these men would eventually develop into salesmen. The advantages that your scheme offers to the men whom you employ can't be offered by this committee. The committee is not in a position to offer the men who take these courses a position paying so much a month or a year, with an advance at the end of the year if they make good. The committee is furnishing an opportunity for a young man to familiarize himself with battery work with the electric vehicle and the committee hopes he has done so to be able to place him, but it is not in a position to insure him a position.

Mr. Jackson: In reply to what Mr. Blizard has said, we don't insure every man a position. It is the ones that make good. They are taking a chance there. They go there for two years. The same thing would apply to what I have in mind, namely, that at some near date in the future of the organization this plan can be carried out through its various branches. Now, with something to train them as an attraction to raise the standard of this particular garage man, this charger, this mechanic, we can make progress. He is the man I am asking about with the view that if something like this is taken up I can organize a branch in Denver and give those men the benefit of some kind of training that will elevate the standard there. Now, in Denver we need good electric garage managers, men that know something about the technical side of the business. We are handicapped along those lines and a course would be just as applicable through this organization to that mechanic and battery man as it would to the salesmen, and I believe a course to those men would produce a better performance of the vehicles. Now, on account of the condition out there, I am attempting to revise the methods of garaging cars, for that reason alone, at so much a month for garage attendance plus the current.

Mr. Witherby: Mr. Chairman, I believe Mr. Jackson's ideas are along the lines of some of our most prominent and older associations. The National Electric Light Association, the American Gas Institute, and the Commercial Gas Association have a sort of correspondence course or school wherein the secretary, the permanent secretary of the Association, is the head, the center, the headquarters wherein by making proper application, seconded perhaps by two or three members of the association, these younger men could apply for membership in this educational course which could be conducted by the association, and wherein they could ask questions and get plausible, short, terse and direct-to-the-point answers. I don't know of any one work that the Association could undertake which would be more far-reaching and meet just the line of argument that Mr. Jackson has brought out than by this Association undertaking to carry on, by correspondence, a method of instructing the younger men to fit them more completely for what is necessary from day to day.

Mr. Curtis: Along that line it might be interesting to know that we are inviting students or salesmen throughout central stations into our plant and showing them our work, a plan with which everybody is familiar, I think. It gives them not a technical but a general education of the electric vehicle which carries with it incidentally some general ideas of selling. It covers a period from two to four weeks. We are getting very excellent results. I think there is a lot of that kind of thing being done that is not generally known about.

Mr. Witherby: Right along the line of Mr. Curtis' remarks, he wound his statement up with the fact that it was not generally known. Now, that is just the trouble. If the Association undertakes it as an association and it is an association work, it is bound to be generally known. Every member of the Association will feel that he has a perfect right to use that, to send that knowledge broadcast and make the most of it at every point, and if the Association is the father of it there is no reason why it won't do an immense amount of widespread good through it.

Mr. Day Baker: I would like to say that Mr. H. F. Thompson of the Massachusetts Institute of Technology has been taking up with some of the technical schools in Boston the desirability of introducing an electric vehicle course and he has already received from the Wentworth School in Boston and the Franklin Institute an acceptance of his offer to co-operate with them in having an electric vehicle course taught in those schools. Mr. Thompson has merely made a preliminary report, but I thought it would be interesting to the committee to know that this matter was being taken up in this way with our technical schools in Boston.

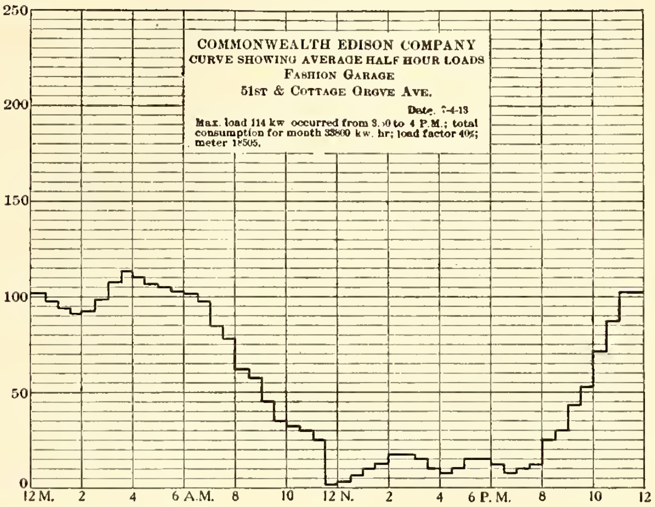
Mr. Niesz: The Chicago Section has taken up preparatory work along a little different line from that outlined in the report and that is in the appointment of a committee to investigate the possibilities of educating the men who are actually working either as battery men or garage men or drivers of electric vehicles to advance them in the knowledge of the business in which they are employed. It is not high school work or technical school work, it is the education of the practical man who is now working and who is not sufficiently trained in the details and the scientific part of the work to make him a valuable man in his particular line of work. The proposal is to establish some sort of a school, probably a night school, at which these men who are employed could be instructed in the various parts of electric vehicle work. That committee has not got along far enough to make any definite report of its action, but I thought it worth mentioning that such a proposal was undertaken by the Chicago Section and was along a line which was supplementary to the educational work contained in this report.

The President: If there is no further discussion, Mr. Blizard, do you wish to conclude?

Mr. Blizard: Apparently there is little that I can add to the report. I think Mr. Jackson possibly has the impression that the committee's work could not be applied to cities like Denver or New York or Philadelphia, or other cities, offering an opportunity for starting such a course as we have started in Cleveland, but the committee would be very glad indeed to co-operate with the local people in such cities. If Mr. Jackson will get in touch with the committee or allow me to get in touch with him a little later I would be very glad to co-operate with him in starting just such a course as we started in Cleveland. The committee has been feeling its way a little bit and it hasn't gone far enough yet to be sure that the methods laid down are going to be successful. If the city representatives here today who feel that they have opportunities for the starting of such a course as the educational committee proposes to put through in Cleveland will communicate with the committee, the committee will be very glad indeed to co-operate with them and, as has been suggested, the committee would like to act as a clearing house for such courses.

Rates and Charging Stations Committee Report

To the Convention of the Electric Vehicle Association of America



IN 1911, the Committee on Rates and Charging Stations gathered much data on prevailing rates and facilities for battery charging from 82 of the largest cities in the United States. The report showed a very great variation in rates, which was taken as evidence that the central stations had not given the attention to the matter the business deserved. The committee, therefore, recommended low rates to garages, both public and private, by the central stations, and low charging rates by the garages to their regular customers.

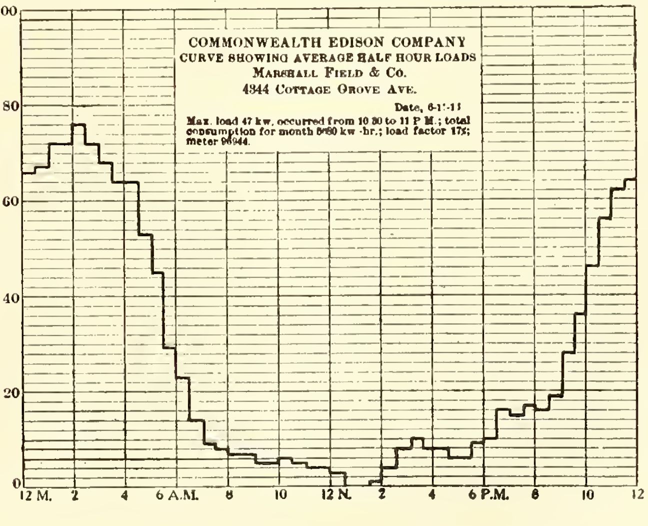
In order to determine the effect of these recommendations, the committee this year recanvassed the central stations in cities of 25,000 or more inhabitants, and is pleased to report a very marked improvement over the 1911 report.

In order to reduce the great mass of detail on rates to a more tangible form, the committee took two examples:

First: A public garage having 24 passenger cars and 12 commercial cars as regular patrons. From data at hand it was calculated that this garage would have a demand of 60 kw., a connected load of 100 hp. and would take 13,200 kwh. per month.

Second: A private garage, with only one passenger car, the average demand being 2.5 kw., a connected load of 6 hp., and a consumption of 175 kwh. per month.

These cases were figured out on the rates reported by each city, and the rate per kwh. which would be earned was determined. It is interesting to note that the average, as reported by 91 of our largest cities, is 3.007 cents per kwh. for the public garage and 5.338 cents for the private garage.



Comparatively little change has been made by the public garages toward making separate charges for the current actually used, the prevalent practice being a monthly rate, depending upon the size of the vehicle, or a flat price per charge regardless of quantity taken. Out of 128 answers to the committee's questions only 31 cities report the garages in their district as metering the current.

Some charging stations in our largest cities have found it necessary to install heavier equipment for the increasing demand for rapid charging rates. In order to determine these demands, and if conditions warranted it, to make recommendations for equipment for charging stations, this committee asked a series of questions, but so little data was returned that it is not worth mention.

In Chicago, the garage owners formed a wide-awake, active association, and have published a small handbook containing much data and instructions intended for owners of electric cars. The book also contains a list of all garages where current can be had for charging, both in Chicago and its suburbs.

Associations of this character should be encouraged and assisted, and the committee believes our own Association would be strengthened if more of the electric garage owners could be induced to join and take active part in the work.

Through the kindness of one of our member companies, we have been furnished three typical curves, showing graphically the current demand for the 24 hours.

Curve 1 shows the current demand of a garage for commercial vehicles exclusively.

Curve 2 shows a garage where passenger cars are cared for.

Curve 3, another garage where both passenger and commercial vehicles are accommodated.

Every central-station manager must be impressed with the desirability of such a load as these curves represent.

This report would not be complete without a word about the battery-service system originated by the Hartford Electric Light Company.

Under this system the Hartford Company buys, maintains, charges and installs in a customer's truck all batteries necessary for its continuous operation, claiming the advantages to users are:

First, a substantial reduction in truck investment.

Second, no charging apparatus or garage necessary.

Third, a battery exchange system which insures unlimited mileage and continuous service from trucks.

Fourth, relief from care of batteries.

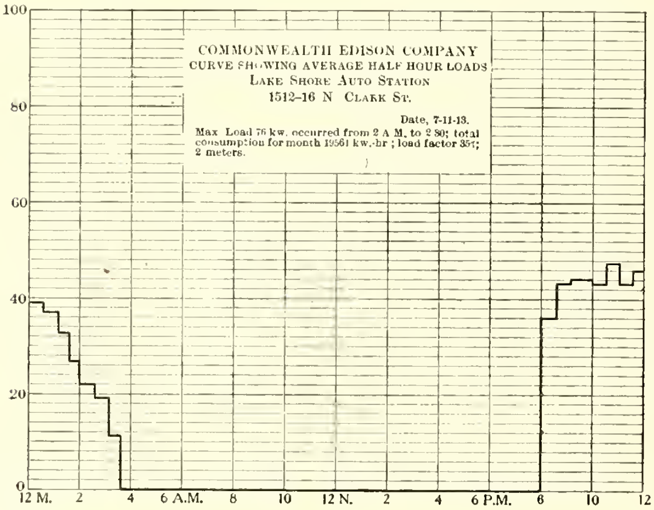
Fifth, reduction of all items of battery cost, including current to a basis of miles traveled per month.

For this service the company charges a flat rate of from $15 to $60 per month, depending upon the size of the truck, to which is added a mileage charge of from 1½ cents to 7 cents, depending upon the capacity of the truck and miles traveled per month.

The Washington Water Power Company, of Spokane, Wash., we are informed, has adopted a similar system, differing only in the equipment used.

There are many, no doubt, like this committee, genuinely interested to know what the final results will be when this system has been thoroughly tried out and proved by time.

Owing to the great amount of detail covered by this committee's report, it is impracticable to show it in a single tabulation. The committee has therefore arranged it in five tables, grouping the related figures together as closely as possible.



First (Table A) are the rates per kwh. earned by the public and private garages, taken as examples and figured from the rates reported (Table B) by the central stations.

In Table C are given the number of public and private charging stations reported, with the cost to the public for the service they render.

In Table D are given the number of vehicles reported in each city and the approximate percentage increase that each of the three general classes have enjoyed in the past two years.

In Table E we have listed the central stations reporting, the number of electrical vehicles owned by them, and their garaging facilities.

Respectfully submitted, John F. Gilchrist, chairman; E. S. Mansfield, W. C. L. Eglin, James T. Hutchings, Frank M. Tait, F. W. Frueauff, Frank J. Stone, John R. Anderson, Jr., C. E. Michel, Adolph Hertz, committee.

DISCUSSION.

Mr. C. F. Smith: Looking at these curves, I wondered if any of the companies represented can report any filling in of the valley of the central station load which they can trace back to the increased use of electric vehicles.

The President: Just to start the ball rolling I might cite one instance of a very large transportation company having quite a number of vehicles; I don't know the exact number. To find out whether, as a matter of practice, getting away from all theory and without the knowledge of the consumer of the current, current was used on the peak. We made a very quiet test of the service in New York City and we found nothing at all was taken on the local peak. Trucks are all used during the day. It doesn't seem possible theoretically nor that it would happen to be practical, but we didn't get any of these batteries for operating these vehicles on the service until after seven o'clock and they were all off again before any kind of load occurred during the next day. It is a sort of automatic filler-in for minimum hours which needs no control, provided you know that it is a day business.

Mr. F. W. Smith: One cannot help, as he reads through this report and studies it carefully, be impressed with the tremendous amount of work that has been done by Mr. Gilchrist's committee, work that will be of great value to this association. The thought was suggested thus to me in looking over this report as well as the report of the garage committee that some improvement might possibly be effected in the future by amalgamating those two committees. They are covering to some extent at least the same work, and perhaps something can be done along that line during the coming year. As to the question that one of the speakers raised with regard to filling up the valley, in part of the publicity campaign through this year the committee have used and quoted from some figures of the public service company of New Jersey and also St. Louis, where they give concrete figures as to the increase in income as the result of the electric vehicle load, and that that is the situation throughout the country will show, probably to some extent at least, perhaps not appreciably in the load curve, but it stands out in the point of revenue. I noticed one point of the apparent difference in Mr. Gilchrist's report that I would like to call attention to, where is set forth the number of garages. I have picked out New York, of course, that being the first city that I naturally referred to and I find that under the column "Number of charging stations, public," there are no public garages indicated there and in the next column, which indicates the private garages, they set forth two hundred. Then, if we refer to the report of the garage committee which contains local reports from the several cities we find that they give New York credit for four commercial garages, ten passenger and two combination, being public garages. I think it would be well, particularly as unfortunate errors do creep in in having this report printed, as Mr. Gilchrist pointed out, and in view of the great value of the information contained in the report of the rates and charging stations, that the committee herhaps have this paper reprinted. We did not receive the material in New York until rather late and we all know how hard it is to get this material through in time, and then they had to be sent back to Chicago for correction and in that way some errors have crept in for which New York, I regret to say, is at least partially responsible. Perhaps with my remarks brought to the attention of the committee it will be considered of enough importance to have it reprinted in a proper manner.

The President: Is there any further discussion? I have heard nothing said this morning on the relative cost of gasoline. Of course, all know that the price of gasoline is going up constantly. In the city of Paris it has now gone as high as seventy-four cents a gallon; in Spain it sells at ninety-eight cents a gallon, whereas the price of electricity is constantly going down. Is there any further discussion? Mr. Gilchrist, would you care to say a few more words?

Mr. John F. Gilchrist: I would just like to say in reply to Mr. Smith's comment, we are very much obliged to him for calling our attention to that. The data came in from all over the United States and we had to depend absolutely on what we received and it is quite possible that in many instances the companies may not have perfectly understood the questions and the committee would appreciate it if any correction that may be found will be called to its attention, and whether it is printed or not we will see that a corrected report is compiled. I would like in discussing it to give proper credit to my assistant, Mr. George B. Foster, who did the major part of the work which was done in Chicago on this report.

Mr. Jackson: I might offer one suggestion that some of these figures be verified. In the case of Denver, where he classifies the Central Colorado Power Company and the Denver Gas & Electric Light Company, he has given the figures of the Denver Gas & Electric Light Company to the other company and my company shows blank. If that occurs frequently it might be well to verify some of these figures, because my company appears here in a vacant space, and the figures allotted to the other company are the ones that I sent in.

Mr. John F. Gilchrist: I would say in this connection a

		TABLE A—RATE DATA		TABLE C—CHARGING STATIONS. GARAGE RATES.				TABLE D—VEHICLE REPORT.						TABLE E—CENTRAL STATIONS				
No.	City.	Public (Wholesale) Rate, Cents.*	Private (Retail) Rate, Cents.†	Number of Public Charging Stations.	Number of Private Charging Stations.	Electricity Only.	All Services Included, Per Month.	Number.	Per Cent Increase in Two Years.	Vehicles 4,000 Lbs. or Under.	Per Cent Increase in Two Years.	Over 4,000 Lbs. Capacity.	Per Cent Increase in Two Years.	Name of Company.	No. Electric Vehicles in Co. Service.	Do You Maintain Your Own Garage?	Do You Furnish Public Charging?	Do You Furnish Garage to Public?
1.	Akron, Ohio	...	5.00	2	35	Contract	Contract	185	65	17	100	3	100	Northern Ohio Tr. & Lt. Co.	3	Y	N	N
2.	Allentown, Pa	2.61	6.58	1	6			4	100	16	100	0	..	Lehigh Valley Lt. & Power Co.	3	Y	Y	N
3.	Atlanta, Ga	1.62	4.50	2	50	75c. per ch.		100	50	5	..	0	..	Georgia Ry. & Power Co.	3	Y	N	N
4.	Aurora, Ill	3.10	5.21	2	33			32	100	2	100	0	..	Western United Gas & Elec. Co.	0	N	..	..
5.	Auburn, N. Y.	...	5.14	1	10			10	100	6	..	0	..	Empire Gas & Electric Co.	2	Y	Y	Y
6.	Baltimore, Md	4.00	5.00	6	3	75c. to $1 ch.	$35	15	300	74	1200	26	400	Cons'd Gas, Elec. Lt. & Pr. Co.	30	Y	Y	Y
7.	Binghamton, N. Y.	2.14	4.57	1	14	75c. to $1 ch.		75	20	4	20	1	..	Binghamton Lt., Ht. & Pr. Co.	6	Y	N	N
8.	Bloomington, Ill	3.00	6.00	3	55	5c. KWH.		75	300	0	..	..	..	Bloomington & Normal Ry. & Lt. Co.	0	N	..	N
9.	Boston, Mass	2.15	3.80	41	117	5c. to 10c. KWH.		214	75	189	120	‡	120	Edison Elec. Illum. Co., Boston.	86	Y	N	Y
10.	Bridgeport, Ct	3.25	6.00	3	12			25	100	10	..	0	..	The United Illum. Co.	35	N	N	N
11.	Brockton, Mass	3.91	6.30	1	10			15	200	10	200	0	..	Edison Elec. Ill. Co., Brockton.	4	Y	Y	N
12.	Brooklyn, N. Y.	3.31	6.25	18	25		$35 to $45	100	100	350	100	40	100	Edison Elec. Illum. Co., Br'klyn	14	Y	N	N
13.	Brooklyn, N. Y.	5.00	5.00	1	6	5c. KWH.		12	20	3	..	..	..	The Flatbush Gas Co.	1	Y	Y	N
14.	Buffalo, N. Y.	2.46	6.73	3	125		$35 to $40	550	120	60	..	7	..	Buffalo General Electric Co.	7	Y	N	N
15.	Cambridge, Mass	2.16	4.03	1	7	5c. KWH.—50c Min.		20	60	8	60	2	..	Cambridge Electric Light Co.	8	Y	N	Y
16.	Canton, Ohio	...	...	..	25			50	50	0	0	0	..	The Canton Electric Co.	1	N	N	N
17.	Charleston, S. C.	3.15	4.57	..	..	$8 per month		6	..	..	..	..	..	Charleston Cons. Ry. & Lt. Co.	..	..	..	..
18.	Charleston, S. C.	7.00	7.00	..	..			..	..	..	..	..	..	Charleston-Isle of Palms Tr. Co.	0	N	N	N
19.	Chattanooga, Tenn.	...	...	2	2			5	100	1	0	4	..	Chattanooga Ry. & Light Co.	1	Y	N	N
20.	Chicago (Suburbs)	2.48	6.85	16	340	5c-10c. KWH.		575	100	75	100	2	..	Public Service Co.	6	Y	N	N
21.	Chicago, Ill	3.25	6.85	69	620	$30 to $40.		2500	..	665	..	49	..	Commonwealth Edison Co.	97	Y	Y	N
22.	Clinton, Iowa	5.00	5.00	0	12	5c. KWH.		12	..	0	0	0	..	Clinton Gas & Electric Co.	..	..	..	..
23.	Colo. Spgs., Colo	1.75	6.50	2	10	$1.50 per ch.		90	20	3	..	0	..	Colo. Spgs. Lt., Ht. & Pr. Co.	2	Y	N	N
24.	Columbus, Ohio	...	...	5	175			194	..	6	..	0	..	Columbus Railway & Light Co.	0	N	N	N
25.	Council Bluffs, Ia.	5.40	5.40	0	6	$2 per ch.		20	..	0	0	0	..	Citizens' Gas & Electric Co.	0	N	N	N
26.	Dallas, Tex	3.73	5.00	2	10	$1.50 per ch.	$30	115	15	5	15	0	..	Dallas Electric Lt. & Power Co.	3	Y	N	N
27.	Dallas, Tex	...	...	..	..			..	..	..	..	..	..	Texas Power & Light Co.	..	..	..	..
28.	Danville, Ill	...	5.00	1	12	8c. KWH.	$20	50	75	0	0	..	..	Danville Street Ry. & Light Co.	0	..	..	..
29.	Dayton, Ohio	3.03	6.35	2	35	$1.50 per ch.	$25	150	30	8	30	4	30	Dayton Power & Light Co.	5	Y	N	N
30.	Denver, Colo	...	3.60	..	..			..	..	..	..	..	..	Central Colorado Power Co.	..	..	..	..
31.	Denver, Colo	...	...	16	116	75c charge.	$25 to $35	822	100	48	1600	5	..	Denver Gas & Electric Light Co.	24	Y	N	N
32.	Des Moines, Ia.	3.80	4.75	31	54	6c. to 4c. ch. $1.25 ch.		160	50	50	100	4	100	Des Moines Electric Co.	1	Y	N	N
33.	Detroit, Mich	2.36	3.80	21	257	4c. per KWH.	$32 to $65	810	..	150	..	15	..	Edison Illuminating Co.	34	Y	N	N
34.	Detroit, Mich	2.00	...	4	..	2c. to 4c. KWH.		..	..	..	..	..	..	Murphy Power Co.	52	Y	N	N
35.	Dover, N. H	4.00	4.00	1	2			2	100	0	0	1	..	Twin State Gas & Electric Co.	0	N	N	N
36.	Dubuque, Ia	5.00	...	0	4			3	100	3	100	0	..	Union Electric Co.	3	Y	N	N
37.	Duluth, Minn	2.40	4.80	2	21	6c. KWH.		38	40	3	100	0	0	Duluth Edison Electric Co.	2	N	N	N
38.	Easton, Pa	...	...	..	..			..	..	..	..	..	..	Eastern Pennsylvania Power Co.	..	..	..	..
39.	Elmira, N. Y.	...	...	0	4			10	..	5	..	0	0	Elmira Water, Lt. & R. R. Co.	2	N	..	N
40.	Erie, Pa	2.85	4.75	3	0	75c.-$1.50 ch.	$15 to $25	160	..	6	..	0	0	Erie County Electric Co.	0	Y	N	N
41.	Evansville, Ind	1.91	4.50	4	30	$1 to $1.25 ch.		100	25	2	25	4	25	Public Utilities Co.	1	Y	N	N
42.	Fall River, Mass	2.06	5.40	..	..	$1 mo. HP.		..	..	..	..	..	..	Fall River Electric Light Co.	1	..	..	..
43.	Fitchburg, Mass	...	...	0	0			0	0	0	0	0	0	Fitchburg Gas & Elec. Light Co.	..	..	..	..
44.	Fort Smith, Ark	2.48	5.00	0	6			0	..	3	50	0	0	Fort Smith Light & Trac. Co.	3	Y	Y	N
45.	Fort Worth, Tex	3.22	5.00	1	15	$1.50-$3 ch.	$25	46	150	4	..	0	0	Ft. Worth Power & Light Co.	0	N	N	N
46.	Harrisburg, Pa	2.76	5.04	1	25	56c. KWH.		20	50	10	50	0	0	Harrisburg Light & Power Co.	4	Y	Y	Y
47.	Hartford, Ct	...	...	..	175	75c. per ch.		250	6000	45	..	2	..	Hartford Electric Light Co.	14	Y	N	N
48.	Hopkinsville, Ky	...	6.00	0	1			1	100	0	..	0	0	Kentucky Public Service Co.	0	N	N	N
49.	Houston, Tex	...	...	..	..			..	..	..	..	..	..	Houston Electric Co.	..	..	..	..
50.	Huntingt'n, W. Va.	1.55	4.37	1	7		$18	22	15	2	15	1	..	Cons. Light, Heat & Power Co.	2	Y	N	N
51.	Indianapolis, Ind	5.00	5.00	..	50		$25	200	10	50	..	0	0	Indianapolis Light & Heat Co.	0	Y	N	N
52.	Indianapolis, Ind	2.00	4.50	..	20		$30	350	300	100	300	50	300	Merchants' Heat & Light Co.	6	Y	N	N
53.	Jackson, Mich	3.00	5.00	1	5	$1 charge.		9	67	2	67	0	0	Commonwealth Power Co.	1	Y	N	N
54.	Jacksonville, Fla	...	...	..	..			..	..	..	..	..	..	Jacksonville Traction Co.	..	..	..	..
55.	Jersey City, N. J.	2.89	6.46	84	278	10c. to 3¼c.		204	126	218	633	84	633	Public Service Co.	9	N	N	N
56.	Joplin, Mo	2.64	5.43	2	2	Flat rate.		15	..	2	..	0	0	Empire District Electric Co.	2	Y	N	N
57.	Kansas City, Kan.	3.50	...	1	11			..	..	..	..	..	..	Dept. Water & Street Lighting.	0	N	N	N
58.	Kansas City, Mo.	1.96	4.75	2	385	$1 to $1.25.		530	150	39	150	21	150	Kansas City Electric Co.	9	Y	Y	N
59.	Kingston, N. Y.	3.30	5.40	0	1			1	..	0	0	0	0	Kingston Gas & Electric Co.	0	Y	N	N
60.	Lancaster, Pa	2.50	2.50	0	16	Various rates.		18	120	3	120	1	0	Lancaster Gas, Light & Fuel Co	1	Y	N	N
61.	Lawrence, Mass	...	4.50	1	9	None		5	400	16	400	2	..	Lawrence Gas Co.	17	Y	Y	Y
62.	Lincoln, Neb	...	5.40	2	2	$7 month.		95	50	5	50	0	0	Lincoln Gas & Elec. Light Co.	2	N	N	N
63.	Little Rock, Ark.	2.60	6.75	2	15	Reg. rate plus 10%		24	50	1	..	0	0	Little Rock Ry. & Elec. Co.	1	Y	N	N
64.	Los Angeles, Cal.	1.21	4.78	..	..			..	..	..	..	..	..	Los Angeles Gas & Elec. Co.	1	..	..	..
65.	Los Angeles, Cal.	1.21	4.78	..	..	$1 charge.		1000	..	24	..	1	..	So. Cal. Edison Co.	20	Y	N	N
66.	Los Angeles, Cal.	4.00	4.00	..	9	6c. KWH.		1000	300	20	300	3	..	Pacific Light & Power Co.	0	Y	N	N
67.	Lynchburg, W. Va.	...	8.00	..	..			..	..	..	..	..	..	Lynchburg Trac. & Light Co.	..	..	..	..
68.	Lynn, Mass	...	...	2	19	15c. KWH.		20	50	4	50	0	0	Lynn Gas & Electric Co.	3	Y	Y	N
69.	Macon, Ga	2.06	3.48	0	6	None		5	50	2	50	0	0	Macon Ry. & Light Co.	0	N	N	N
70.	Madison, Wis	...	...	..	..	None		..	..	..	..	..	..	Southern Wisconsin Power Co.	..	..	..	..
71.	Memphis, Tenn.	3.49	4.72	0	75	$1 charge.		..	..	..	..	..	..	Memphis Cons. Gas & Elec. Co.	5	Y	Y	Y
72.	Meriden, Conn	...	6.00	0	0	6c. KWH. flat		165	300	30	..	..	..	Meriden Electric Light Co.	..	..	Y	..
73.	Minneapolis, Minn.	2.12	4.84	4	250	$1.25 charge.	$35	500	..	50	..	3	..	Minneapolis Gen. Electric Co.	6	Y	N	N
74.	Mobile, Ala	4.00	4.00	0	31			39	10	1	..	0	0	Mobile Electric Co.	2	Y	N	N
75.	Montgomery, Ala	...	5.00	1	2			10	..	3	..	0	0	Montgomery Lt. & Wt. Pr. Co.	1	N	N	N
76.	Muskogee, Okla	2.49	4.95	2	6	$1.50 charge.		22	100	8	100	0	0	Muskogee Gas & Electric Co.	5	Y	Y	Y
77.	Nashville, Tenn	1.67	5.99	6	35	$1.50 charge.		74	200	1	..	1	..	Nashville Railway & Light Co.	2	Y	N	N
78.	Newark, Ohio	...	5.40	0	18	None	$25	20	50	0	0	0	0	Ohio Light & Power Co.	0	N	N	N
79.	Newark, N. J.	2.89	6.46	84	278	10c. to 3¼c. KWH.		204	126	218	633	84	..	Public Service Co.	10	N	N	N
80.	New Bedf'd, Mass.	3.50	3.50	1	7	15c. to 20c per KWH.		1	100	12	100	1	0	New Bedford Gas & Edison Lt. Co.	9	Y	N	N

TABLE A—RATE DATA				TABLE C—CHARGING STATIONS		GARAGE RATES.		TABLE D—VEHICLE REPORT.						TABLE E—CENTRAL STATIONS				
No.	City.	Public (Wholesale) Rate, Cents.*	Private (Retail) Rate, Cents.†	Number of Public Charging Stations.	Number of Private Charging Stations.	Electricity Only.	All Services Included, Per Month.	Number.	Per Cent Increase in Two Years.	Vehicles 4,000 Lbs. or Under.	Per Cent Increase in Two Years.	Over 4,000 Lbs. Capacity.	Per Cent Increase in Two Years.	Name of Company.	No. Electric Vehicles in Co. Service.	Do You Maintain Your Own Garage?	Do You Furnish Public Charging?	Do You Furnish Garage to Public?
81.	Newburgh, N. Y.	1.87	3.86	1	1	$1 per charge.		2	..	0	0	0	0	Cent. Hudson Gas & Elec. Co.	0	Y	N	N
82.	New Haven, Ct.	...	...	2	8	$1 per charge.	$30	12	..	7	..	0	..	The United Illuminating Co.	3	Y	N	N
83.	New Orleans, La.	2.47	5.72	5	10		$20 to $30	30	300	18	300	2	..	New Orleans Ry. & Light Co.	12	Y	N	N
84.	New York, N. Y.	3.57	9.50	..	200	5c. and 6c. KWH.		225	64	1910‡	64	‡	64	The New York Edison Co.	125	Y	Y	N
85.	Norristown, Pa.	2.25	8.71	..	..			..	..	..	..	..	..	Norristown Elec. Lt. & Pr. Co.	..	..	..	..
86.	Norwich, Ct.	...	5.00	0	5			5	..	1	..	0	0	City Gas & Electric Co.	1	Y	N	N
87.	Omaha, Neb.	3.00	5.70	4	50	$1 per charge		195	25	5	25	0	0	Omaha Elec. Lt. & Power Co.	4	Y	N	N
88.	Oshkosh, Wis.	...	...	2	7	12c per KWH.		17	100	0	0	0	0	Oshkosh Gas Light Co.	0	N	N	N
89.	Pawtucket, R. I.	2.07	8.21	1	5			5	50	2	50	5	50	Blackstone Valley Gas & El. Co.	4	..	..	..
90.	Peoria, Ill.	2.10	5.00	4	133	10c KWH.	$25	260	250	10	250	22	0	Central Illinois Light Co.	3	Y	N	N
91.	Philadelphia, Pa.	2.98	6.00	21	116	6c. K W H., min. 50c.		254	221	218	100	225	100	Philadelphia Electric Co.	38	Y	Y	N
92.	Pittsburgh, Pa.	...	...	4	25	$1 charge	$7 per wk.	250	50	15	50	5	50	Duquesne Light Co.	4	Y	N	N
93.	Portland, Ore.	1.78	5.00	..	..			..	..	..	..	..	..	Northwestern Electric Co.	..	..	..	..
94.	Portland, Ore.	2.17	4.00	1	30		$25 to $45	55	11	35	11	4	11	Portland Ry., Lt. & Power Co.	4	Y	N	N
95.	Portland, Me.	...	...	0	0			0	0	0	0	0	0	Cumberland City Lt. & Pr. Co.	0	Y	Y	N
96.	Providence, R. I.	1.9	5.86	4	11	5c. per KWH.		25	28.5	24	28.5	4	..	Narragansett Electric Light Co.	5	Y	N	N
97.	Reading, Pa.	4.02	5.	1	4			6	..	4	..	..	..	Metropolitan Electric Co.	0	N	N	N
98.	Roanoke, Va.	1.84	5.00	..	2	None		2	100	0	0	0	0	Roanoke Railway & Electric Co.	0	N	N	N
99.	Saginaw, Mich.	3.68	7.2	2	50	$1.50	$25	100	25	25	25	0	0	Saginaw Power Co.	4	Y	N	N
100.	St. Paul, Minn.	2.71	5.58	2	100		$35 to $45	120	..	25	..	10	..	St. Paul Gas Light Co.	1	Y	N	N
101.	Salem, Mass.	...	6.00	1	3			15	34	7	34	0	0	Salem Electric Light Co.	6	Y	Y	N
102.	San Antonio, Tex.	3.11	5.00	4	64	10c per KWH.		135	..	0	0	0	0	San Antonio Gas & Elec. Co.	1	N	N	N
103.	San Francisco, Cal.	2.5	4.00	5	20	$1.25 per ch.	$35 to $40	125	50	20	50	5	..	City Electric Co.	1	N	N	N
104.	San Francisco, Cal.	...	3.00	0	6	None		5	..	2	..	0	0	Sierra & San Francisco Pr. Co.	0	Y	N	N
105.	San Francisco, Cal.	2.5	5.00	6	25	$1.50 charge.	$35 to $40	38	200	16	100	6	100	Pacific Gas & Electric Co.	28	Y	N	N
106.	San Juan, P. R.	4.69	10.00	..	1	None		1	100	0	0	1	100	Porto Rico Railway & Light Co.	0	Y	Y	N
107.	Savannah, Ga.	1.49	3.73	2	20	$1.50 per ch.	$25 to $35	100	20	2	20	0	0	Savannah Electric Co.	2	N	N	N
108.	Schenectady, N. Y.	...	5.00	1	15	$1 per charge		13	43	26	43	1	0	Schenectady Illuminating Co.	8	Y	Y	Y
109.	Seattle, Wash.	.47	3.00	2	65	75c. per ch.	$30	155	..	10	..	0	0	Puget Sound Tr., Lt. & Pr. Co.	3	..	N	N
110.	South Bend, Ind.	2.25	3.09	4	20	$1 per charge		60	50	10	50	5	50	Indiana & Mich. Electric Co.	4	Y	N	N
111.	Springfield, Ill.	3.60	4.50	3	100	10c. KWH.	$25	150	100	4	100	0	0	Springfield Ry. & Light Co.	1	Y	N	N
112.	Springfield, Mo.	4.995	7.26	3	..	20c. KW		80	50	0	0	0	0	Springfield Gas & Electric Co.	0	N	N	N
113.	Spokane, Wash.	...	...	..	...			..	..	..	..	..	..	Big Bend Light & Power Co.	..	..	..	..
114.	St. Louis, Mo.	2.38	5.79	12	150	10c. KWH.	$35 to $45	550	?	200‡	?	‡	?	Union Elec. Light & Power Co.	41	Y	N	N
115.	Stamford, Ct.	...	...	1	6	None		8	250	12	250	0	0	Stamford Gas & Elec. Co.	5	Y	Y	Y
116.	Superior, Wis.	4.00	4.00	1	1	None		2	300	1	300	0	0	Superior Wt., Lt. & Power Co.	1	Y	Y	N
117.	Tacoma, Wash.	...	...	..	..			..	..	..	..	..	..	Puget Sound Tr., Lt. & Pr. Co.	..	..	..	..
118.	Tampa, Fla.	5.4	5.4	..	..	6c. KWH.		2	..	..	..	..	..	Tampa Electric Co.	..	..	..	..
119.	Terre Haute, Ind.	4.09	5.16	1	45	$1 per charge.	$30	80	30	0	0	0	0	T. H. Idnpls. & East. Trac. Co.	1	Y	N	N
120.	Topeka, Kan.	5.00	...	2	20	$1.50 per ch.	$20 to $30	39	50	1	..	1	..	Topeka Edison Co.	40	N	N	N
121.	Waterbury, Ct.	6.00	6.00	..	..	6c. KWH.		..	..	..	..	..	..	United Elec. Light & Water Co.	..	..	..	..
122.	Waterloo, Iowa	4.00	5.00	2	26	8c. KWH.		31	150	5	150	..	..	Citizens' Gas & Electric Co.	36	Y	N	N
123.	Washington, D. C.	3.93	6.36	11	103	75c. charge	$30	756	20	260	20	25	20	Potomac Electric Power Co.	7	Y	N	N
124.	Wichita, Kan.	...	4.57	..	6	$1.50 charge.		42	50	3	50	0	0	Kansas Gas & Electric Co.	3	Y	N	N
125.	Wilmington, Del.	3.00	6.30	1	8			10	100	6	100	0	0	Wilmington & Phila. Trac. Co.	0	..	..	N
126.	Wilmington, N. C.	...	...	1	10	$1.50 charge.	$10	25	300	1	300	0	0	Tide Water Power Co.	1	Y	Y	N
127.	Woonsocket, R. I.	2.00	8.2	0	3	None		2	50	3	50	0	0	Blackstone Val. Gas & Elec. Co.	1	Y	..	N
128.	Zanesville, Ohio	2.41	5.97	0	6			6	66	0	0	0	0	Ohio Electric Railway Co.	1	..	..	..

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‡Figures given include all sizes of trucks and have, therefore, been tabulated under the smaller class.

*Rate per KWH., 13,200 KWH. Mo., 60 KWH. Max., 100 HP. Conn. †Rate per KWH., 175 KWH. Mo., 2.5 KWH. Max., 6 HP. Conn.

Y, yes; N, no.

TABLE B—RATE DATA.

The number in the first column corresponds to the number and name of the city in Table A. Where a city is given two lines, the wholesale rate is given on the first line and the retail rate on the second. Where but one line is given, wholesale and retail rates are the same.

1. 3c. to 1.5c per KWH.; minimum $1 per KW. No. cash discount. Quantity rate.
5c. flat per KWH.; minimum $1 per KW. No cash discount. Quantity rate.

2. 8c. to 2.6c. per KWH.; minimum 50c. per HP. 10 per cent cash discount. Quantity rate.

3. 5c. to 1.5c. per KWH.; minimum $1.11. 10 per cent cash discount. Maximum demand rate.
5c. to 3c. per KWH.; minimum $1.66. 10 per cent cash discount. Quantity rate.

4. $1 per HP. plus 4c. to 2.5c. per KWH.; minimum $3. Maximum demand rate.

5. $1 demand plus 4c. to 1.5c. per KWH.; minimum $1. Maximum demand.
$1 per HP. plus 4c. per KWH.; minimum $2. 10 per cent discount. Maximum demand.

6. 4c. per KWH.; minimum $5 for each vehicle. Flat rate.
5c. per KWH.; minimum $5. Flat rate.

7. $2.50 KW. of demand plus 1c. per KWH. Maximum demand rate.
First 100 KWH. 5.5c.; excess 3.33c., less 10 per cent; minimum $4. Quantity rate.

8. 3c. net per KWH.; minimum $5. Flat rate.
5c. per KWH.; minimum $5. Flat rate.

9. 10c. to 2c. per KWH.; minimum 75c. per meter. Off peak rate.
10c. to 3c. per KWH. with discounts additional; minimum 75c. Battery rate.

10. 7c. per 100 KWH., or less to .3.25c. for 4800 KWH. or over; minimum per HP. $1.50 to 50c. Flat rate.

11. 10c. to 4c. per KWH.; minimum $1. 10 per cent discount. Demand rate.
7c. per KWH.; minimum $1. 10 per cent discount. Flat rate.

12. 10c. to 3c. per KWH.; minimum $1 HP. Quantity discount.

13. Flat rate 5c. per KWH. No minimum. No discount. Quantity rate.

14. Primary charge $3.25 to $2.50 per KW.; second charge 1.5 to 1c. per KWH. Discount 25c. KW. Maximum demand rate.
8c. to 1.5c. KWH.; minimum $1. Discount 1c. per KWH. Maximum demand rate.

15. 5 5/9c. to 2½c. per KWH.; minimum $1 per HP. Discount 10 per cent 15 days. Off peak rate.

16. Maximum 6c.; average 3c. per KWH. Quantity rate.
Maximum 6c.; average 4c. per KWH. Quantity rate.

17. Primary 25 KW. at $2; excess $1.50; secondary 3c. to 1c.; minimum 25c. per HP. Maximum demand rate.
$8 per car per month unlimited. Flat rate.

18. 7c. per KWH. Flat rate.

19. 5c. to 2c. per KWH.; minimum $1.053 per HP. Discount 5 per cent. Maximum demand rate.

20. Direct-current, primary 50 KW. at $1.40, excess at 90c.; secondary 5c. to 9c. Discount 10 per cent secondary charge. Off peak rate.
11c. to 6c. and 4c. per KWH., less 1c. for cash; minimum $1.50 per charge plug. Wright's demand.

21. Guaranteed maximum rate 4½c. per KWH.; minimum 50c. per HP. connected. Off peak maximum demand.

11c. to 6c. and 4c. per KWH., less 1c. for cash; minimum 50c. per HP. connected. Wright's demand.

22. Flate rate 5c. per KWH. Off peak rate.

23. Fixed charge 50c. per HP. connected, plus 7c. to 77c. per KWH. 10 per cent discount; minimum $1 HP. Maximum demand.

11c. KWH., less 45 per cent discount; minimum $5. Maximum demand.

24.

25. 6c. per KWH., less 10 per cent discount; no minimum. Flat rate.

26. 5c. to 3⅓c. per KWH., less 10 per cent. Discount 50c. HP. Connected minimum. Quantity rate.

27. Quantity rate.

28. 5c. to 2c. per KWH. Must be used during off peak hours. Quantity rate.

Flat rate 5c. per KWH.; minimum $5. Quantity rate.

29. 4.2c. to 3c. per KWH., according to hours use of demand. 5 per cent discount. Maximum demand.

6.6c. to 5.4c. per KWH., less 5 per cent; no minimum. Quantity rate.

30. $1 HP., plus 4c. KWH., less 10 per cent; also $2 per HP., plus $1.75, less 10 to 15 per cent discount. Quantity rate.

Flate rate 4c. per KWH., less 10 per cent; minimum from $5 to $12.50. Quantity rate.

31.

32. 5c. to 3c. per KWH., depending upon hours use of capacity. 5 per cent discount; minimum $2.50. Maximum demand.

33. Flat rate 3c. KWH., less 5 per cent or demand $3 per KW., plus 1c. to 6c. KWH.; minimum $1. Off peak rate.

Flat rate 4c. per KWH., less 5 per cent discount; minimum $1. Flat rate.

34. Flat rate 2c. per KWH.

Do not sell to private garages.

35. Flat rate 4c. per KWH. net.

36. Flat rate 6c. per KWH., less 1c.; minimum $1 HP. Flat rate.

10c. per KWH down, according to quantity; minimum $1 per HP. Quantity rate.

37. 3c. per KWH., less 20 per cent discount; minimum $15 per month. Flat rate.

6c. per KWH., less 20 per cent discount; minimum $4 per month. Flat rate.

38.

39. 7c. to 2c. per KWH. Quantity rate.

40. 3c. per KWH., less 5 per cent; minimum 75c. month. Flat rate.

5c. per KWH., less 5 per cent; minimum 75c. month. Flat rate.

41. Fixed charges $2 net per active KW., plus 1c. per KWH. Quantity rate.

5c. to 2½ per KWH., less 10 per cent.; minimum 50c. per HP. Quantity rate.

42. 6c. to 1½c. per KWH., less 10 per cent; minimum $1 per HP. Quantity rate.

43.

44. 5c. to 1.99c. per KWH. Quantity rate.

45. 5c. to 3c. per KWH.; minimum $1. Quantity rate.

46. 4c. to 3c., less 10 per cent. Quantity rate.

5.6c. to 3c., less 10 per cent; minimum monthly guarantee of $10. Quantity rate.

47.

48. None given.

6c. per KWH.; net minimum $3.50. Flat rate.

49.

50. 3c. to 1c. per KWH.; minimum $1 per HP. 5 per cent cash discount. Quantity rate.

6c. to 3c. per KWH.; minimum $1 per HP. 10 per cent cash discount. Quantity rate.

51. 5c. per KWH.; minimum $1 per month per HP. of demand. No discount. Maximum demand.

5c. per KWH.; minimum $2 per month. No discount. Maximum demand.

52. 2c. per KWH.; minimum $1 per month. No discount. Maximum demand.

4½c. to 2½c. per KWH.; minimum $1 per month. No discount.

53. 4c. per KWH., less 1c.; minimum $3. Flat rate.

6c. per KWH., less 1c.; minimum $3. Flat rate.

54.

55. Primary $2 per KW., plus 3c. to 1c. per KWH.; minimum $3. 5 per cent discount if pri. A. C. V. Maximum demand.

10c. to 2c. per KWH.; minimum 50c. per HP. of connected load. Cash. Quantity rate.

56. $1.50 per HP. connected and 1⅛c. per HP. HV.; minimum none. 10 per cent discount.

8c. to 5c. per KWH.; minimum $1 per HP. connected. No discount.

57. 3½c. per KWH.; minimum $2.50. No discount.

4c. to 3½c. per KWH.; minimum $2.50 to $3.50. No discount.

58. $2.50 per KW. of average demand, plus 1c. KWH.; minimum demand charge, 5 per cent on $100—10 per cent excess. Off peak rate.

5c. per KWH.; minimum $3 per month. 5 per cent discount.

59. 7c. to 3½c. per KWH.; minimum $1 per month. 10 per cent discount. Quantity rate.

60. 5c. per KWH.; minimum $1 per month. 10 per cent discount.

4½c. to 2½c. per KWH.; minimum $1 per month. 10 per cent discount.

61. None.

5c. to 4c., less 10 per cent; minimum $1. Quantity rate.

62. 5c. per KWH.; no minimum charge. 10 per cent to 40 per cent discount. Quantity rate.

175 demand charge 6c. per KWH.; minimum $1.58 net per month. 10 per cent discount. Quantity rate.

63. 10c. to 5c. and 3c., based on demand; minimum $10. 20 per cent off peak. Maximum demand.

7½c. per KWH., less 10 per cent discount; minimum $2. 20 per cent off peak. Flat rate.

64. 5c. to 1.2c. per KWH., less 20 per cent for off peak use; minimum 35c. per HP. installed. Quantity off peak.

65. 5c. to 1.2c. per KWH.; minimum 35c. per HP.; lowest minimum $1 per month, less 20 per cent off peak. Quantity off peak.

66. 4c. per KWH.; minimum $1 per month. No discount. Flat rate.

67. None given.

8c. per KFH.; minimum $1.50. No discount.

68. 6c. to 3.1c. per KWH.; minimum $2 per month. 1c. per KWH. discount. Quantity rate.

9c. to 5c. per KWH.; no minimum charge. 1c. per KWH. discount. Quantity rate.

69. 4.05c. to 2.025c. per KWH.; minimum $1 per month. No discount. Quantity rate.

70. Not a central station.

71. 1¾c. to 1¼c. per KWH.; no minimum charge, net. Maximum demand.

$1 per month, plus 3c. energy rate. No minimum charge, net. Maximum demand.

72. 6c. flat, per KWH.; no minimum charge, net.

73. 1.609c. to 1c. per KWH.; minimum $2, plus $1 per HP. of maximum demand excess 100 HP. Maximum demand.

6c. to 2½c. per KWH.; minimum $1 to 50c. per month per HP. 5 per cent to 25 per cent discount. Maximum demand.

74. 4c. per KWH.; minimum charge $1, net.

75. 2½c. to 1½c. per KWH.; no minimum. No discount. Quantity rate.

5c. per KWH.; no minimum. No discount. Quantity rate.

76. 5.5c to 2.2c per KWH.; minimum $1 per HP. connected. 10 per cent discount. Quantity rate.

77. $1.25 per KW. of demand, plus 4c. to 0.7c. per KWH., less 5 per cent; minimum $1.05 to 55c. HP. per month.

6.66c. per KWH., less 10 per cent; minimum $5. Flat rate.

78. None.

6c. per KWH.; minimum $2. 10 per cent discount. Flat rate.

79. Primary charge $2 per KW. — 3c. to 1c. per KWH.; minimum $3. 5 per cent discount, if A. C. V. Maximum demand.

10c. to 2c. per KWH.; minimum 50c. per HP. of connected load. Cash. Quantity rate.

80. 3½c. per KWH.; net minimum 75c. No discount. Off peak rate.

81. 10c. to 4c. per KWH.; minimum $2.50. No discount. Maximum demand rate.

82. 7c. to 3¼c. per KWH.; minimum $1 per month. No discount. Quantity rate.

83. Primary charge $3 to $1.50, plus secondary 5c. to 75c., less 10 per cent from secondary. Maximum demand rate.

9c. for 30 hours' use, plus 5c. for excess; 50c. per HP. 1c. discount for cash. Quantity rate.

84. 5c. to 3c. per KWH.; $25 monthly minimum. No discount. Quantity rate.

9½c. to 5c. per KWH.; no minimum charge or discount. Quantity rate.

85. 11c. to 3c. per KWH.; minimum $3. No discount. Quantity rate.

86. None given.

5c. to 2c. per KWH.; minimum $2 per month. Quantity rate.

87. 6c. to 2c. per KWH.; no minimum charge, net. Quantity rate.

6c. per KWH.; no minimum charge. 5 per cent discount. Quantity rate.

88. 8c. per KWH.; minimum $1 per month. 5 per cent to 30 per cent

10c. per KWH.; minimum $1.00 per month. 5 per cent to 25 per cent discount.

89. 2.4c. to 1.8c. per KWH.; minimum $240 per year. 10 per cent discount. Maximum demand.

10c. per KWH.; minimum 75c. per month per HP. connected. No discount. Maximum demand.

90. 2.8c. to 2.25c. per KWH.; minimum $56 per month. 10 per cent discount. Quantity rate.

5.55c. per KWH.; minimum 75c. per month. 10 per cent discount. Flat rate.

91. 6.75c. to 3.66c. per KWH.; subject to hours use of maximum, less 30 per cent discount. Flat rate.

6c. per KWH.; minimum $5 per charge set. No discount. Flat rate.

92. None.

Off peak 6c. per KWH., less 1c. KWH.; minimum $2.50. Flat rate.

93. 5c. to .005c. per KWH.; minimum $1 per KW. of demand. Quantity rate.

94. $1.25 per KW., plus 6c. to 1c. per KWH.; minimum $3. Maximum demand.

4c. per KWH. net; minimum $3. Flat rate.

95. 6c. per KWH., less discount sliding scale, less 10 per cent; minimum $1. Quantity rate.

96. $1.55 to $1.15 per HP., plus 1.7c. to 1.2c. per KWH. net; minimum $1.55 to $1.15 HP. Maximum demand.

5c. per KWH. net; minimum $1 to $5. Flat rate.

97. 10c. to 3c. net rate not to exceed 5c. per KWH., less 5 per cent; minimum $5.26. Maximum demand.

98. 3c. to 1.5c. per KWH.; minimum $1 KW. demand. Quantity rate.

5c. per KWH.; minimum $1. No discount. Flat rate.

99. 8c. to 4c. per KWH., less 10 per cent; minimum $1. Quantity rate.

100. 7.3c. to 3c. per KWH., less quantity discount 5 per cent to 25 per cent, cash discount 10 per cent; minimum $1 per HP. Maximum demand.

7c. to 3c. per KWH., less quantity discount 5 per cent to 25 per cent, cash discount 10 per cent; minimum $3 per HP. Maximum demand.

101. No business.

12c. to 7c. per KWH. Discount 1c. per KWH.; minimum $1. Off peak rate.

102. 5c. to 3c. per KWH. Minimum 50c. Quantity rate.

103. 3c. to 2½c. per KWH. Off peak rate.

4c. per KWH. Flat rate.

104. None.

3c. per KWH., net; minimum $1. Flat rate.

105. 2½c. per KWH., net. Flat off peak rate.

5c. per KWH., net; minimum $1 per month. Flat rate.

106. 10c. to 3½c. per KWH. Quantity rate.

107. 1.66c. Discount 10 per cent, 10 days; minimum $1 per HP. connected per month. Flat rate.

7c. to 3c. Discount 10 per cent, 10 days; minimum $2.50 per month. Quantity rate.

108. None.

5c. per KWH.; net 15 days; minimum $1. Flat rate.

109. 2.6c. per KWH. Quantity rate.

3c. per KWH.; minimum $2. Quantity rate.

110. 6c. to 1c. per KWH. Discount 10 per cent; minimum $1 per HP. Quantity rate.

111. 4c. per KWH., less 10 per cent; minimum 90c. per meter. Flat rate.

5c. per KWH., less 10 per cent; minimum 90c. per meter. Flat rate.

112. 5.55c. per KWH. Discount 10 per cent. Flat rate.

15c. to 3c. per KWH. Discount 10 per cent; minimum $1 to $3.50. Quantity rate.

113. No business.

114. Primary charge $3 to $1.50; secondary 3½c. to ¾c. Discount 5 per cent on $25 minimum monthly portion bill. Off peak rate.

10c. to 6c. Discount 5 per cent on $25; 1 per cent on excess; minimum $1.50 per month. Maximum demand rate.

115. None.

12c. per KWH., less 9c. to 1c., according quantity; minimum $2. Quantity rate.

116. 6c. to 5c. KWH. Discount 1c. KWH. Maximum demand.

117. No business.

118. 6c. KWH. 10 per cent discount. (Estimate—business not permanently established.) Flat rate.

119. 8c. to 4c. 10 per cent discount; minimum $4 per rectifier. Maximum demand.

120. 5½c. per KWH. Discount ½c. KWH. Flat rate.

9½c. to 5½c. per KWH. Discount ½c. all over 200 KWH. 5c. net. Quantity rate.

121. 6c. per KWH. Flat rate.

122. 4c. per KWH., net, ½c. KWH. Discount 10 days. $1 HP. Flat rate.

5c. per KWH., net, ½c. KWH. Discount 10 days. $1 HP. Flat rate.

123. Primary charge $4 to $2; secondary 6c. to 8c. KWH.; ½c. per KWH. penalty after 10 days. Off peak rate.

10c. to 5c. per KWH. Penalty 10 per cent in 10 days; minimum $2.50 per month. Maximum demand rate.

124. 5c. to 3c. per KWH., net; minimum $3.25 to $2 per plug. Quantity rate.

125. 8c. to 3c. based on hours used; minimum $1 per HP. Discount on hours used. Flat rate.

126. 7c. to 2½c. KWH. Discount 10 per cent; minimum $4 per month. Quantity rate.

127. Service charge of $2 per HP. demand, plus 2½c. KWH., subject to discounts. Maximum demand.

10c. to 3c. per KWH.; minimum 75c. per HP. Quantity rate.

128. 7½c. to 2½c. KWH. Discount 10 per cent. Quantity rate.

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great many of the people forgot to even sign their name and we had to depend upon the postmark to tell where the reports came from.

The President: Well, that is the first time that Denver has ever slipped up.

Mr. John F. Gilchrist: I am not saying that is the case with Denver. I don't know anything about it, but that is a general explanation. I presume it occurred in fifty per cent of the reports that came back.

Mr. F. W. Smith: Anyone who has had experience in committee work, particularly of this character which calls for statistical information from member companies, appreciates the difficulties under which Mr. Gilchrist's committee has labored. In the work of the National Electric Light Association those of us who have had experience know that it is difficult to get a proper percentage of replies to many of the questions that are sent out by the committees. It was because of the great importance of this paper and the fact that in looking it over I was brought to a realizing sense that the committee had depended upon information from other sources that I made the suggestion that the report be reprinted after the committee had had an opportunity to check up on the possible discrepancies. I think it is of such value and contains such information for the association that it ought to be authentic. If the members will assist the committee in giving them the information, I think that we will have no difficulty in having it revised.

The President: While protests seem to be in order, I should like to enter one on behalf of New York supplementing what Mr. Smith has said. I can quickly count up about twenty-four public stations that I know about and instead of two hundred private charging stations I think there are about fourteen hundred. I am struggling between modesty on the one hand and a desire for accuracy on the other hand.

Mr. Day Baker: I hardly know whether this would come up under the scope of the committee on rates and charging stations, but there has been considerable touring done with electric vehicles in New England, especially during this last season, and a great many tourists have found it very hard to get current, even in some of the electric light stations. I am wondering if it would come within the scope of this committee to urge on electric light stations throughout the country to be prepared to charge electric vehicles in the case of touring parties. I had the privilege of riding through the mountains in Vermont with Colonel Bailey recently, and it was very hard to get current at some of the stations. They knew very little of the methods of charging and they really cared very little about charging the machines. It was necessary to connect the exciter bars and to charge from the exciter bars. I had a talk with the central station manager at Palmer, Mass., only Saturday, and he stated that his company received practically no income from the electric vehicle industry, but, nevertheless, they were willing to do something to help the electric vehicle industry along. He stated that they had at the present time run from their exciter bars to the outside of their building a pair of wires and a charging plug and that any one touring from Boston to Worcester to Springfield could always get current of them night and day, although they had never advertised to supply current. He stated that up to the present time he had always been pleased to present this current to any user of the electric vehicle because he wanted to see the industry progress. If we could only have some arrangement through the cities of the country whereby the electric light stations would be willing to charge cars, it would make it very easy to tour. Colonel Bailey recently made a trip from Boston to Burlington, Vermont, and he found it very difficult to get current. In some of the larger cities, like Rutland, for instance, he could secure no current. At Montpelier the central station people said that they could charge it, but they didn't want to, there wasn't any money in it and therefore they didn't see why they should. It so happened that one of the members of the company came along at that time and he said, "Why, of course," and he made arrangements for Colonel Bailey to get a charge. At St. Johnsburg, Vermont, there was no way to charge except by the exciter bars, and considerable difficulty was experienced on account of the connections in getting the proper amount of charge. I believe if this committee can take up and send a circular to all central stations where electric vehicles are likely to travel that it would be of great help to the users of the electric vehicle in getting their vehicles charged.

The President: It is hoped that the committee on rates and charges will be able to obtain some information from Colonel Bailey. I wired him and asked him if he wouldn't communicate with that committee and be prepared to furnish to the committee a general report as to the charging conditions that he found from New York to Chicago, and I hope we may have that information from Colonel Bailey, which is along the line of Mr. Baker's suggestion that that committee take unto itself the task of finding out what the conditions are throughout the several cities.

Mr. C. F. Smith: In connection with what Mr. Baker has said I would like to put in a plea to the central station men to have at hand a current charging plug with the rest of their equipment. The committee on standardization worked a long while and inflicted on us a certain charging plug, and the Boston Edison Company immediately got in line and spent something like a thousand dollars and adopted it, and our own garages are about the only places we can use them. We immediately rewired our receptacle in parallel with the new type so that we can have a charge in an average garage by using an old type plug receptacle.

Avoids Tax Imposition

It pays to be the owner of an electric automobile these days. That is the electric ones are to be preferred to the steam and gasoline ones for the simple reason that the tax is much lower in many states. The state department is having its own troubles figuring the tax on electric machines, but it is much lower than that of the gasoline cars.

The new Michigan license tax rates on automobiles at their horse power. It prescribes how the horse power of the steam and gasoline machines shall be figured out, but it takes the manufacturers' horse power figures for the electric machines. That is where the trouble comes in. The manufacturers of the electric machines base their horse power in a different way and the average coupe is only rated at three or four horse power.

The Michigan state department received an application for a license from a Detroit woman. Her bill for the coming year was $1.75. Last year the same automobile cost her $22 in state taxes.

The Detroit Electric and Motor Car Company, which recently established a Fort Worth, Texas, branch, moved July 1 into its new quarters, 1113 Commerce street. The building is a brick structure erected by A. & L. August, at a cost of $8,000, for the especial use of the present occupants. It is of brick and is the first exclusively electric garage in Fort Worth. A showroom in front is 25x40 feet. The garage in the rear, equipped to charge twelve cars at one time, is 25x160 feet. Several models of the Detroit car are on display.

Publicity and Advertising Committee Report

To the Convention of the Electric Vehicle Association of America

THE report of the committee read before the Association at its convention last year gave in considerable detail the results obtained up to that time (October, 1912). This report submitted in full the plan and scope of the campaign, and was rather fully illustrated, in addition to which lantern slides, showing typical advertising copy, were shown.

This year the report will cover the work of the committee from that time, or for the 12 months ending October 1, 1913.

The subscriptions for the 1912-1913 campaign were increased since the last report to 102 by the addition of one contributor (Gould Storage Battery Company), making the total subscriptions $42,036.52, which, together with interest on deposits, made available the total sum of $42,403.29.

The central-station companies, 81 in number, contributed 55 per cent; the battery and other accessory manufacturers, eight in number, 32 per cent; the electric vehicle manufacturers, 13 in number, 13 per cent.

The campaign was continued to its conclusion, about August 1, last, along the lines laid down in the report submitted last year. There were, in all, a total of 451 separate advertisements inserted throughout the several groups of mediums. The total cost of the campaign, including all items of expense—advertising, agency commission, mechanical charges, which covered drawing, setups, electrotypes for various mediums, mechanical work, postage and miscellaneous—was $42,053.99, leaving a balance to be brought over to the second year of $349.30.

As was pointed out in last year's report, it was not expected that a campaign of such a general educational character would produce many direct inquiries. There have been received, in round figures, some 2,000 communications, as result of the advertising, about evenly distributed as between commercial and passenger, with a number of general inquiries. Some of these inquiries came, literally, from every corner of the globe.

Of especial interest in connection with foreign influence created by the Association's publicity work, are associate memberships secured; one from Berlin, two from London; one active membership from the Philippine Islands, and three from Canada. An inquiry was also received as to associate membership from Brazil, and, in all probability, will result in an additional member. The influence of this advertising may be well said to be world wide.

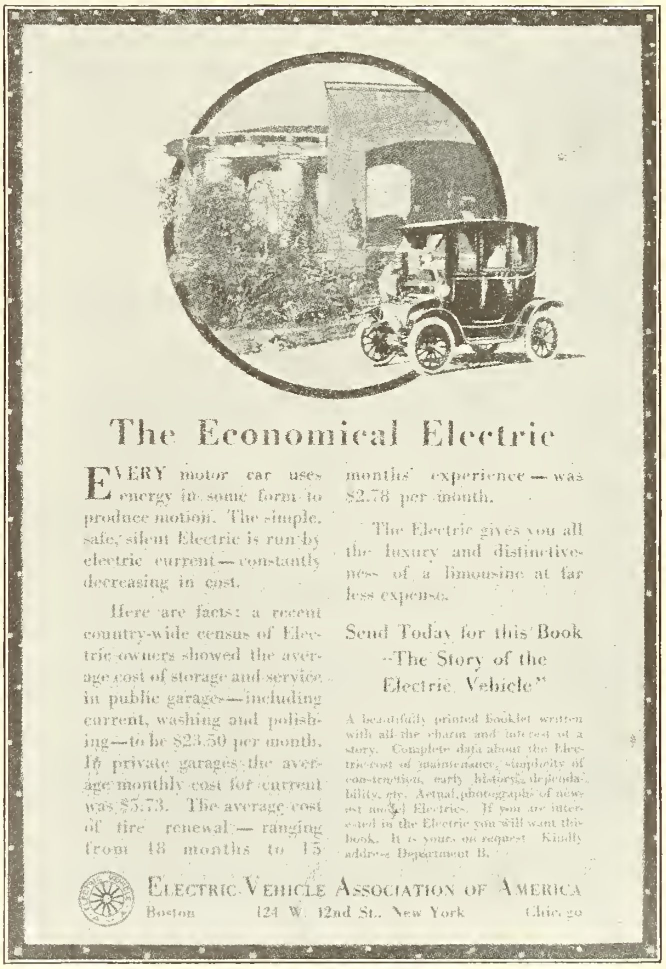
SECOND YEAR—1913-1914 CAMPAIGN.

In the early spring, the committee proceeded to solicit contributions to a fund which would make it possible to carry on the publicity work for another year. The first effort was to commit the contributors to the first year's fund to a similar or larger contribution for the second year.

It early developed that the active campaign being carried on by the Society for Electrical Development, concerning which most of you are familiar, would, to some extent, interfere with the collection of funds for the campaign of this Association. This has been found to be the case more particularly among the central-station interests, and, within that field, to bear especially on the larger central-station companies who had already committed themselves to the movement of the Society for Electrical Development. It is a pleasure to record, however, that, aside from a few notable exceptions, all of the larger central-station interests finally renewed their subscriptions to our association.

In some few cases, contributors to the first year's fund have since discontinued business, and, in other cases, there seemed to be good financial, or other reasons, for the non-support of the second year's campaign.

When the committee had succeeded in securing pledges to approximately $10,000, a general campaign was launched for subscriptions, and each branch of the industry was covered with suitable follow-up letters. These communications were varied and repeated from time to time.



The Economical Electric

EVERY motor car uses energy in some form to produce motion. The simple, safe, silent Electric is run by electric current—constantly decreasing in cost.

Here are facts: a recent country-wide census of Electric owners showed the average cost of storage and service in public garages—including current, washing and polishing—to be $23.50 per month. In private garages the average monthly cost for current was $5.73. The average cost of tire renewal—ranging from 18 months to 15 months' experience—was $2.78 per month.

The Electric gives you all the luxury and distinctiveness of a limousine at far less expense.

Send Today for this Book
"The Story of the
Electric Vehicle"

A beautifully printed booklet written with all the charm and interest of a story. Complete data about the Electric—cost of maintenance, simplicity of construction, early history, dependability, etc. Actual photographs of newest model Electrics. If you are interested in the Electric you will want this book. It is yours on request. Kindly address Department B.

Electric Vehicle Association of America
Boston 124 W. 42nd St., New York Chicago

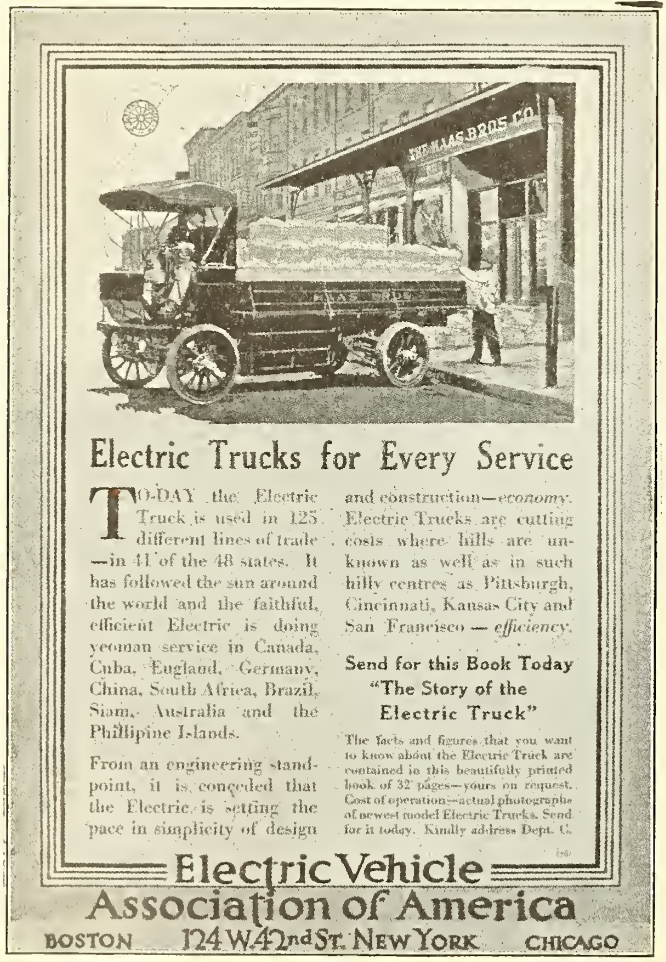
Typical Advertisement on Passenger Vehicle.

During the 36th annual convention of the National Electric Light Association, held in Chicago, June 2 to 6, the committee occupied space in the exhibition hall, where original drawings, advertising copy and other literature was displayed, and where the secretary of the Association, as well as a representative of the McJunkin Advertising Agency, and the chairman of this committee were in rather constant attendance. The effort made to increase the subscription list was rewarded with fair results.

At the time of the completion of this report, the total subscriptions for the 1913-1914 campaign amounted to $34,046.38, received from 107 contributors. The list of subscribers, subdivided as between central stations, vehicle, battery and other accessory manufacturers, is as follows:

CENTRAL STATIONS.

Alliance (Ohio) Gas & Pwr. Co.; Asheville (N. C.) Pwr. & Lt. Co.; Athens (Ga.) Ry. & Elec. Co.; Bartlesville (Okla.) Int. Ry. Co.; Baton Rouge Elec. Lt. Co.; Benton Harbor-St. Joe Ry. & Lt. Co.; Bay State St. Ry. Co.; Blackstone Valley Gas & Elec. Co. (Pawtucket); Beaumont (Tex.) Elec. Lt. & Pwr. Co.; Bristol (Tenn.) Gas & Elec. Co.; Brush (Galveston) Elec. Co.; Charles City (Iowa) Elec. Lt. & Htng. Co.; Chester (Mass.) Elec. Lt. Co.; Circleville (Ohio) Lt. & Pwr. Co.; Citizens Gas, Elec. & Htng. Co. (Mt. Vernon, Ill.); City Lt. & Trac. Co. (Sedalia, Mo.); City Lt. & Wtr. Co. (Amarillo, Tex.); Connecticut Pwr. Co. (New London); Cons. Gas, Elec. Lt. & Pwr. Co. (Baltimore); Cosmopolitan (Chicago) Elec. Co.; Commonwealth Edison Co.; Dallas Elec. Lt. & Pwr. Co.; Dayton Pwr. & Lt. Co.; Denver Gas & Elec. Co.; Danbury & Bethel Gas & Elec. Lt. Co. (Danbury, Conn.); Durham (N. C.) Trac. Co.; Edison Elec. Illg. Co. of Boston; Edison Elec. Illg. Co. of Brocton; Edison Elec. Illg. Co. of Brooklyn; Edison Elec. Illg. Co. of Detroit; Elmira Wtr., Lt. & R. R. Co.; El Paso Elec. Ry. Co.; Empire Dist. Elec. Co.; Fremont Gas & Elec. Co.; Galveston Elec. Co.; Georgia Ry. & Pwr. Co.; Granite Falls (Wash.) Elec. Co.; Hattiesburg (Miss.) Trac. Co.; Houghton County Elec. Lt. Co.; Knox (Ind.) Elec. Lt. & Pwr. Co.; Knoxville (Tenn.) Ry. & Lt. Co.; La Harpe (Ill.) Elec. Lt. & Pwr. Co.; Lehigh Valley Lt. Co. (Allentown, Pa.); Lincoln Gas & Elec. Co.; Louisiana (Mo.) Lt., Pwr. & Trac. Co.; Lycoming Edison Co. (Williamsport, Pa.); Massillon Gas & Elec. Co.; Memphis Cons. Gas & Elec. Co.; Meridian (Miss.) Lt. & Ry. Co.; Montgomery Lt. & Wtr. Pwr. Co. (Ala.); Narragansett Elec. Lt. Co. (Providence); Nevada-Cal. (Symes Bldg., Denver) Pwr. Co.; New Bedford Gas & Edison Lt. Co.; N. Y. & Queens El. Lt. & Pwr. Co.; New York Edison Co.; Northern Ohio (Akron) Trac. & Lt. Co.; Omaha Elec. Lt. & Pwr. Co.; Paducah (Ky.) Lt. & Pwr. Co.; Penn. Central Lt. & Pwr. Co. (Altoona); Pensacola Elec. Co.; Peoria Gas & Elec. Co. (Cent. Ill. Lt. & Pwr. Co.); Plymouth (Ind.) Elec. Lt. & Pwr. Co.; Potomac Elec. Pwr. Co.; Port Arthur Lt. & Pwr. Co. (Texas); Public Service Co. of No. Ill. (Chicago); Puget Sound Trac. & Pwr. Co. (Seattle, Wash.); Rochester Ry. & Lt. Co.; St. Joseph Lt., Ht. & Pwr. Co.; St. Paul Gas Lt. Co.; San Antonio Gas & Elec. Co.; San Joaquin Lt. & Pwr. Co. (Fresno, Cal.); Schenectady Illg. Co.; Simsbury (Conn.) Elec. Co.; Springfield (Ill.) Lt. & Pwr. Co.; Toledo Trac. Lt. & Pwr. Co.; Tampa Elec. Co.; Toronto Elec. Lt. Co.; Trumbull Public Serv. Co. (Warren, Ohio); Union Elec. Co. (Dubuque, Iowa); Union Elec. Lt. & Pwr. Co. (St. Louis); United Elec. Lt. & Pwr. Co.


THE HAAS BROS. CO.

Electric Trucks for Every Service

TO-DAY the Electric Truck is used in 125 different lines of trade—in 41 of the 48 states. It has followed the sun around the world and the faithful, efficient Electric is doing yeoman service in Canada, Cuba, England, Germany, China, South Africa, Brazil, Siam, Australia and the Phillipine Islands.

From an engineering standpoint, it is conceded that the Electric is setting the pace in simplicity of design and construction—*economy*. Electric Trucks are cutting costs where hills are unknown as well as in such hilly centres as Pittsburgh, Cincinnati, Kansas City and San Francisco — *efficiency*.

Send for this Book Today
"The Story of the Electric Truck"

The facts and figures that you want to know about the Electric Truck are contained in this beautifully printed book of 32 pages—yours on request. Cost of operation—actual photographs of newest model Electric Trucks. Send for it today. Kindly address Dept. C.

Electric Vehicle Association of America
BOSTON 124 W. 42nd St. New York CHICAGO

Typical Advertisement on Commercial Vehicle.

VEHICLE MANUFACTURERS.

Anderson Elec. Car Co.; Bailey, S. R., & Co.; Baker Motor Veh. Co.; Borland-Grannis Co.; Broc. Elec. Veh. Co.; Buffalo Elec. Veh. Co.; Commercial Truck Co. of Am.; General Motors Truck Co.; General Vehicle Co.; Kentucky Wagon Mfg. Co.; Rauch & Lang Carriage Co.; Ohio Elec. Car Co.; Tate Electrics Ltd.; Ward Motor Veh. Co.; Waverley Co., The.

ACCESSORY MANUFACTURERS.

Cutler-Hammer Mfg. Co.; Edison, Thos. A.; Electric Storage Battery Co.; Gould Storage Battery Co.; Goodyear Tire & Rubber Co.; General Elec. Co.; Philadelphia Storage Battery Co.; Sangamo Elec. Co.; Wagner Elec. Mfg. Co.; Westinghouse Elec. & Mfg. Co.

As already stated at the time this report was written, the total subscribers to the fund numbered 107, an increase by five over the first year. There are eighty-two central-station companies contributing, an addition of one over last year; the battery and other accessory manufacturers number ten, or two more than last year; the vehicle manufacturers fifteen as against thirteen last year, but there are five within this class who have not subscribed to the second-year fund (some of these have gone out of business), which really makes seven new names within the vehicle manufacturers added to the list.

The ratio of contributions to the total, as divided between these three classes, corresponds very closely to that of the first year; the central-station companies, 54 per cent; battery and other accessory manufacturers, 31 per cent; vehicle manufacturers, 15 per cent.

There are, however, 39 contributors to the first-year fund, including the five vehicle manufacturers already mentioned, who have not, so far, contributed to the second-year fund, while it is interesting to note that there are 47 new names added to the 1913-1914 list, most of which are central-station companies.

It will be seen, therefore, that to the central stations still belong the credit of giving this co-operative advertising campaign the largest amount of support, and it is disappointing to record the fact that of the 35 odd vehicle manufacturers who are at present active in the field, but 15 are supporting this movement.

Every effort has been made to increase the fund, and it is hoped that the experience during the first year may be repeated during the coming campaign. It will be recalled that when the committee decided to launch the first year's campaign and actually start the advertising, there was in hand or pledged, about $35,000; this sum, as already mentioned, having been increased during the progress of the campaign to $42,036.52.

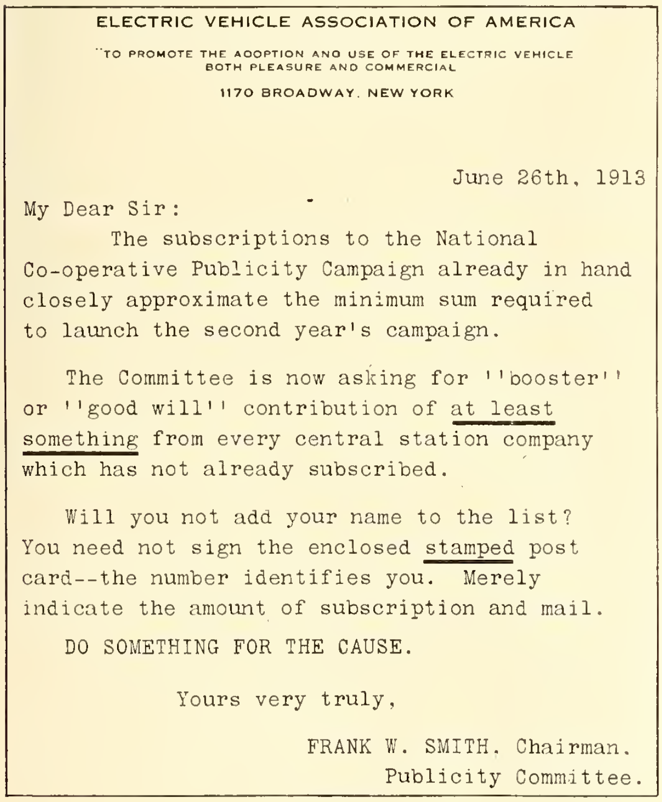
As an index to the efforts of the committee to increase the list of contributors even for small sums, we would point to the circular which was prepared rather carefully and of attractive appearance and was sent to every Class "A" member (the central-station companies) of the N. E. L. A. This communication was sent after your Committee had determined that the list had been practically exhausted by every other effort. The circular is reproduced herewith, together with the return stamped post-card which accompanied same.

This gave every central station company an opportunity to subscribe a sum from $5 to $25, and more, if desired. The result was not gratifying; eight subscriptions were received, totaling $37. It should, of course, be borne in mind that a large number of central stations thus covered are relatively small, and, except on the theory of a general co-operative or booster contribution, lack of response might be expected.

All of this effort to obtain subscriptions has, in this committee's opinion, been of benefit and must have had a certain advertising value, as it kept constantly before the different interests the subject of the electric vehicle. It must be admitted that there are many demands from several directions upon the electrical interests today in the nature of co-operative advertising or association work, but the committee does not intend to cease its efforts toward increasing the fund and thereby making it possible to broaden the scope of the second year's campaign. To this end we appeal to every individual in attendance at this convention to put forth his personal effort to obtain new subscribers.

The campaign planned for the second year involves an expenditure of $33,422.28. This campaign will be carried on through five groups—general magazines, fashion and social, central station, auto trade journals, with a fifth group contemplating the use of three rather special mediums.

Included within the estimated expense is an item representing the cost of preparing and publishing two booklets, one "The Story of the Electric Pleasure Vehicle," and "The Story of the Electric Commercial Vehicle." The booklets will be 8 by 10 inches and a very considerable amount of time has been devoted to their preparation.



ELECTRIC VEHICLE ASSOCIATION OF AMERICA

"TO PROMOTE THE ADOPTION AND USE OF THE ELECTRIC VEHICLE
BOTH PLEASURE AND COMMERCIAL

1170 BROADWAY, NEW YORK

June 26th, 1913

My Dear Sir:

The subscriptions to the National Co-operative Publicity Campaign already in hand closely approximate the minimum sum required to launch the second year's campaign.

The Committee is now asking for ''booster'' or ''good will'' contribution of at least something from every central station company which has not already subscribed.

Will you not add your name to the list? You need not sign the enclosed stamped post card--the number identifies you. Merely indicate the amount of subscription and mail.

DO SOMETHING FOR THE CAUSE.

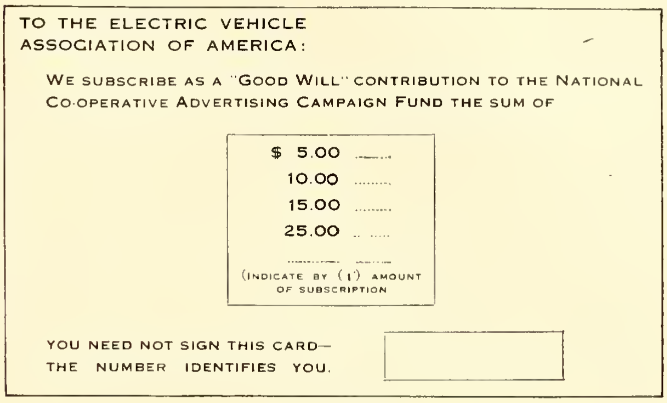
Yours very truly,

FRANK W. SMITH, Chairman,
Publicity Committee.

The Circular

The covers of both booklets are poster effects in three colors, original in design and by a prominent artist. The booklets are printed throughout in two colors and profusely illustrated with pictures of different types of cars in various settings.

Each booklet contains actual photographs of the newest models of the manufacturers, with a brief description of the vehicle. Only the manufacturers are included who are contributors to the campaign.



TO THE ELECTRIC VEHICLE
ASSOCIATION OF AMERICA:

We subscribe as a "Good Will" contribution to the National Co-operative Advertising Campaign Fund the sum of

$ 5.00 ....
10.00 ....
15.00 ....
25.00 ....

(Indicate by (✓) amount of subscription

YOU NEED NOT SIGN THIS CARD—
THE NUMBER IDENTIFIES YOU.

Return Card

The editorial matter takes up the early history of the electric—its reliability and cost of maintenance, including citations of actual performances of both pleasure and commercial electrics. There is, as well, an explanation in non-technical terms of the mechanical simplicity of the electric, with accompanying illustrations.

Artistically printed and well written, these booklets will, the committee believes, be found to impress those who are considering the purchasing of an electric vehicle. They have been produced at an expense, which, as an individual company, and for limited circulation, few would desire to incur.

It is hoped to present sample copies of these two booklets at this meeting for your inspection.

In addition to the quantity of booklets required for the proper follow-up of inquiries received from the magazine publicity, an attempt will be made by the committee to dispose of a quantity of them to central-station companies. This will be done, not with the view of making profit on the sale of the booklets, but in order to make it possible to increase their circulation. It is considered that this wider distribution should not only be helpful to the vehicle and accessory manufacturers who have contributed to the fund, and whose vehicles are illustrated and described in the booklets, but will increase generally the publicity for the electric vehicle, by having these booklets included by the central-station companies as a part of their advertising material. Thus, an opportunity will be given to those central-station companies who have not subscribed to the publicity fund to give some support to the cause at a relatively small expense. It remains to be seen to what extent this support will be forthcoming.

The Association's advertising for the second year will be handled, as before, by the William D. McJunkin Advertising Agency, of New York and Chicago. This agency has now established a New York office, and both the booklets and publicity for the second year have been entirely handled in New York by a representative of the agency working in close collaboration with the committee.

The advertising copy for the second year will be of a somewhat different character than for the previous campaign. It will be more intensive or specific in character, giving actual facts and figures regarding the economy, durability and efficiency of the electric.

The illustrations in the advertising copy for the second year will be reproductions of actual types of vehicles as produced by the several manufacturers contributing to the fund, each manufacturer being equally represented as to the number of insertions throughout the campaign. Two typical advertisements are shown. During the first year's campaign some objection was raised that the copy illustrated a particular make of vehicle and an attempt was made by your committee to produce a composite electric vehicle which would not be illustrative of any one manufacturer's product. The result was not altogether satisfactory.

In each piece of advertising copy, the booklets mentioned above will be featured, and they will be sent in response to all inquiries resulting from the advertising. This year a "key" will be employed, which will afford a definite check on the "pulling" strength of the various media used. These inquiries will be followed up closely from the secretary's office, and, to this extent, the second year's campaign will be a marked improvement over the first year.

Respectfully submitted, *Publicity and Advertising Committee.*

Frank W. Smith, *Chairman;* Arthur Williams, William H. Blood, Jr.

DISCUSSION.

Mr. Gale: It appears to me that one of the most valuable features that the Association has undertaken is covered by this somewhat brief report of Mr. Smith and his associates. The educational value of advertising by this committee as carried on in the periodicals of the country has undoubtedly a high value, but I think that an important part of the work of this committee is embodied in these two publications which they have shown you this morning. I believe that no one central station or local dealer in vehicles could afford to prepare anything so elaborate or complete. Therefore, I believe that it will be of greatest advantage to central stations to secure copies of these and distribute them to their prospective customers. I think the work of this committee might be expanded to include certain healthful suggestions in the way of newspaper advertising copy for the use of central stations. I am aware that many of the central stations, particularly those that have been active in selling electric vehicles, have well organized advertising departments, but many of them have not. The helpful suggestions in the way of newspaper copy would be gratefully received by most of them. Perhaps this copy might advantageously be used to secure names to distribute this pamphlet to. If the work of the National Electric Light Association's commercial section is to be used in any way as worth while, their experience is something as follows: They began publishing books which manufacturers could not afford to publish, because they were broader in their scope than any one manufacturer's product would warrant getting out and they offered these to their members at a slight advance over cost. Hundreds of thousands of such pamphlets have been sold by the commercial section of the National Electric Light Association to the various member companies, and this department is self-sustaining. It was found that these pamphlets supplemented the pamphlets gotten out by the local companies and those issued by the manufacturers and the central stations around the country and many of the dealers in electrical material have found that there was an opportunity to get attractive booklets which tended to increase the interest in electricity as a whole. I want particularly to commend one of these booklets. It contains a great deal of information in the way of data by which one could estimate the cost of operating the vehicle. There is one other point that this Association might co-operate with other associations in and that is the adoption of a standard size of hand-book for distributing information to its members. The National Electric Light Association has recently adopted a standard sized sheet, four and one-half by nine, possibly previously standardized among certain lighting companies, so that all manufacturers interested in this subject can send data sheets of that size to the central stations, knowing that they will fit right into the binders which include other material which the salesmen find useful. This matter can be extended to the electric vehicle industry and the manufacturers would be glad to find central station salesmen already equipped with binders containing electrical material and thereby having a fixed number of customers at hand for every bit of information they might send out.

Mr. Chapin: It has been suggested on one or two occasions within the past four months and more particularly by some central stations who are interested in newspaper advertising that the matrices of the entire cuts as they appear in this campaign shall be reduced to suitable size corresponding to the standard spacing which in that way could be adapted to newspaper advertising in two and three column work. These matrices are obtainable at very small cost and there is considerable demand for their use. I am sure that the past chairman will recommend to the future committee that this action be followed.

Mr. Marsh: In answer to the last speaker I might suggest that it is somewhat difficult to prepare matrices from illustrations, half-tone illustrations that have been designed for publication in periodicals which have a more suitable stock to print them on than the ordinary newspaper. If you make a beautiful illustration such as the committee has made in its advertising, it would be difficult to reproduce that satisfactorily in the newspapers. The line drawing is more suitable for reproduction in newspapers.

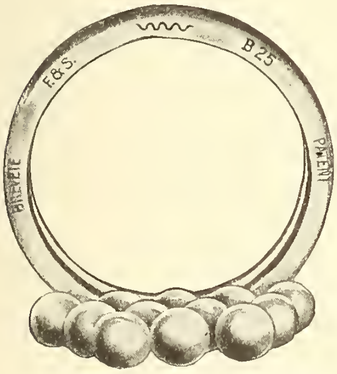
Mr. McJunkin: I think it might be interesting to know what some of the central stations have done to help in this matter of co-operative advertising and how much they have supported the movement. The Commonwealth-Edison Company, in addition to the advertisement which appeared in yesterday's Chicago papers, exploiting the facts that Marshall Field & Company are now disposing of their horses very rapidly and installing electric trucks, published last year twelve complete advertisements, eight on trucks and four on pleasure vehicles, at a cost of nearly forty-four hundred dollars. The co-operative advertising service, which is a part of my organization and which supplies 160 central stations with monthly advertising service of twelve complete advertisements, contains each month one advertisement on either an electric truck or an electric pleasure vehicle. I think that not enough attention has been given to supplying central stations with an appropriate advertising copy and cuts. Last year some effort was made, I understand, by the Association to furnish matrices and electrotypes of proofs, but I do not believe that it was followed up as vigorously or as consistently as it should have been, or as it could be. I think, as Mr. Gale said, much of it would be very welcome, and that many of the central stations have very poor facilities for preparing such advertising. A department of this sort could be conducted with not very great expense. The cuts, of course, would have to be redrawn and the illustrations appearing in the magazines would not do for the ordinary newspaper, but a series could be prepared very easily embracing or covering practically many points in favor of both the pleasure vehicle and the commercial trucks. I think a great deal of attention should be given to this one branch of the work and a very good follow-up system could be conducted during the entire year. I think it will help the whole industry a good deal.

Mr. Frank W. Smith: As to Mr. Gale's suggestion, I would say that after this report had been completed it seemed necessary to change the copy to some extent and make an appeal to the central station interests to link their advertising on behalf of the electric vehicle with the advertising of this association, and this year the copy in the central station magazines will be in that direction. In other words, some comment was made last year that it wasn't of much profit to advertise in central station magazines, because we were advertising to ourselves to a large extent, so that we have changed our form of advertising in that class of medium, and the advertising copies hereafter will be a direct appeal to the central stations to advertise the electric vehicle, and one piece of copy that I have in mind is a hand which holds up these two booklets and which has a caption, "You need these booklets," or something to that effect, and indicates the committee's intention to make it possible for the central station to get these books and put them out. Then the other copy is a direct suggestion that they follow our Association advertising with their own local. As Mr. McJunkin said, we did make an effort during the last year to furnish matrices for central station advertising and we kept a supply for several months going to some twenty-seven companies. Mr. Chapin in his remarks simply followed the suggestion that he made to me some months ago, that those matrices be reduced in size so that they might be used more easily and readily by the central station companies, and I think that is something that we can do, and thus suggestions will be followed if the funds are available.

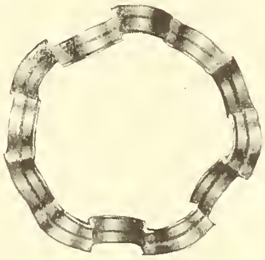
Mr. Williams: Two or three times during the day we have heard the question whether the work of this Association has not been accomplished. My own personal opinion is that the work of this Association is only beginning and that we see the future of the electric vehicle better at the close of this convention than we have ever seen it before, and we see that future very much better because of the work that has been done by this Association through many indications. Take, for example, the expenditure last year of fifty thousand dollars in publicity, and I have no doubt that this year we shall probably have the advantage of our own expenditure being multiplied many times by the encouragement that the advertising of the past will give to manufacturers and the central station companies who begin to see the wonderful field that can be developed through the agency of the electric vehicle. We talk a great deal about it in the abstract and of what lies before us, but I have been reminded today that in the city of Manhattan Island alone in the last year eight million kilowatt-hours were used by electric vehicles, representing an income in estimate of at least a half million dollars. There is a single garage in that city in which the bills are now approaching thirty thousand dollars a year. Looking at it from another point, every central station in the country in any city of any size is today using its best endeavors to advertise the electric car and to make it popular, introducing services, providing charging facilities, advertising, organizing vehicle departments, working along the establishment of this entirely new profession, the traffic engineer; undoubtedly that will be the outcome of the activities of this vehicle agitation. I might go on and mention a number of different directions, all of which I think find their inception in the work that was started under the auspices of this Association.

Ball Bearings for Electrics

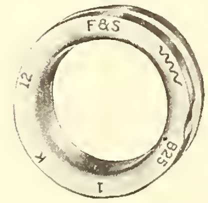
The electrically propelled vehicle is probably the best example of concentrated design that is in general use today. The distance traveled by such a vehicle depends not only upon the amount of power available, but upon the percentage of this amount that can be converted into tractive effort. The elimination of all unnecessary weight in the car and the reduction of friction and electrical losses are about the only ways of increasing the mileage for a given battery and motor power.



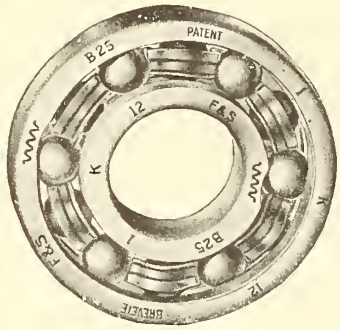
F. & S. Outer Raceway and Balls.



F. & S. Blue Ribbon Retainer.



F. & S. Inner Raceway.



F. & S. Bearing Complete.

The use of alloy steels and light weight bodies has reduced the car weight almost to the limit.. Since there seems to be no good way of reducing the weight of battery and motor, and no way of reducing the electrical losses, most of the manufacturers have turned their attention to the reduction of friction losses. The shaft drive car has helped a great deal, and a few are now changing to worm drive in the effort to obtain a further reduction.

Needless to say, the bearing friction is the most important of all of the mechanical losses and the highest type of anti-friction bearing is required. The annular ball bearing has been adopted on account of its having the lowest friction coefficient. There is of course a vast difference in ball bearings, and their anti-friction qualities. The high polish of balls and raceways and the accurate assembly of the bearing are the two main features, although the separator friction and the energy required to evolve the separator with the balls also has quite an appreciable effect. Any bearing having uniformly hardened steel, highly polished, uniformly hardened balls accurate to .0001 inch, highly polished raceways of a radius equal to approximately .6 of the ball diameter, and a light weight separator touching the balls at one point only should give a minimum friction loss.

Annular ball bearings also vary considerably in their load capacity. Primarily, of course, this factor is determined by the elastic limit, and the method of hardening the steel. Assuming that these qualities, and the accuracy of assembling are equal, the load capacity will then only vary with the form of raceway and the number and diameter of balls in the bearing. The load capacity and the friction loss of a given ball is greatest when the diameter of raceway is equal to the ball diameter. The load capacity and friction loss is smallest when the raceway is a plane, tangent to the ball; since a minimum of friction with a maximum of load capacity is required, a compromise between these limits is necessary. Many experiments have determined a correct radius of curvature which is approximately .6 of the ball diameter and this figure has been adopted by manufacturers as standard.

Assuming all of the previously mentioned conditions as being equal, the load capacity will vary directly with the number of balls and directly as the square of the ball diameter with corrections for the load distribution and a constant which may vary for different forms of raceways, speeds and grades of steel. Mathematically expressed, the formula reads as follows:

$$Pkg=.24xKxNxd2$$

Where N equals number of balls, d equals ball diameter in eighths of an inch (i. e., diameter equals 1 inch, d equals 8, Diam. equals 5/16, d equals 2.5). K, a constant whose value has been obtained from a long series of tests, and .24 is the percentage of balls subject to load at a given instant. As before stated, the values of K vary with the speed. The following values are used by Messrs. Fichtel & Sachs, makers of the F. & S. bearing, and are considered quite conservative:

17—50 r. p. m. 15—200 r. p. m. 13—500 r. p. m.
11—800 r. p. m. 10—1,000 r. p. m. 8.0—1,500 r. p. m.
6.5—2,000 r. p. m. 5.5—3,000 r. p. m.

This bearing, which is shown in the accompanying cuts, has the largest load capacity, it is claimed, of any bearing, due to the number and size of balls used. The accuracy of workmanship, separator design and high quality of steel have made it a standard of quality throughout the trade. Additional information or engineering assistance can be obtained from the J. S. Bretz Company, 250 West 54th street, New York City.

What the Sections Are Doing

Report to the Convention of the Electric Vehicle Association

REPORT OF THE CHICAGO SECTION.

THE Chicago Section has held meetings every Tuesday during the entire year, the enthusiasm of its members remaining at high pitch even during the summer months, when most organizations suspend their usual functions. This constant contact has resulted in building up a fellowship and cordiality among men in this industry that has put the electric vehicle upon a selling basis that is making a marked impression upon the buying public. Instead of being strangers and suspicious of each other, the managers and salesmen of manufacturers of electric vehicles and accessories have learned to know each other, and this close association and hearty fellowship have engendered respect and a spirit of fair dealing advantageous to the individual and the companies interested.

A prospective buyer of trucks epitomized the situation in the following words: "I like to see you electric truck salesmen, because none of you seem to have anything to say against your competitors. You are all boosting the same proposition."

While the personal relations of the passenger car men are friendly and fair, the market conditions are such as to render difficult the equitable trade relations that should exist in a well-conducted industry.

The second-hand car bugaboo is still the nemesis of the trade, although there now seems to be a well-defined movement toward a satisfactory solution of this problem, the details of which are not yet ready to be announced.

The garage men who are members of this association have been active, and as a result of co-operative effort, a large number of excellent electric garages have been started, where expert care is given to electric cars, both passenger and commercial, and the owner can have the assurance that his property will be looked after in highly satisfactory manner.

This section has carried out its policy of co-operation in several important local affairs during the past year. First, it joined with the Garage Owners' Association in a picnic and field day at Cedar Lake, Indiana, on July 25, where a most successful affair was participated in by about 300 members and ladies.

This section, in conjunction with the Chicago Automobile Club, the Chicago Motor Club, the Chicago Automobile Trade Association and the Chicago Garage Owners' Association, organized the Chicago Orphans' Automobile Day Association, the purpose of which is to give a ride and a day of pleasure to the children of the various orphan institutions of this city. The members of this section were active in this movement and contributed by personal work and financial aid to the happiness of 2,500 children.

We also co-operated with other motor organizations in promoting an automobile parade on a day set apart for this event in connection with the Oliver Hazard Perry Centennial Celebration. As the result of our efforts 57 electric vehicles were entered, as compared with 39 gasoline vehicles. One prize for the best decorated truck, two for the two best decorated passenger vehicles, and one for the largest number of trucks of one make which were in the parade were all given to electric vehicles.

While most of our meetings are devoted to informal discussions on various topics connected with the industry, we have had a number of very interesting talks on announced subjects, including The Ideal Garage, Rectifying Apparatus, a series on Tires, and other pertinent items of interest.

The notable meetings of the year were the annual meeting in May and the meeting during the National Electric Light Association in June. At the former we were favored with an able address from President Williams and excellent papers by Mr. W. C. Anderson and Mr. E. E. Witherby. At the latter, brief and interesting talks by Past President Blood, Vice-President Smith, Secretary Robinson and Mr. McJunkin.

Although not directly a result of the activities of this section, it is, nevertheless, worthy of mention that some of the members of this section have, during the past year, promoted a new magazine, entitled Electric Vehicles, which is at present the only publication devoted exclusively to the electric vehicle industry. A magazine of this character, well conducted, should appeal to this association as worthy of recognition and support and should be of substantial benefit to the industry.

The membership of this section has grown from 60 on October 1, 1912, to 75 at the present time. We have lost 11 members on account of their removal to other places, but have still made substantial gains, both in number and class of members.

The crowning feature of the year's work of this section is the honor and pleasure of holding in Chicago the fourth annual convention of this Association.

The Chicago Section sincerely hopes that its work and that of the convention committee and others who are responsible for the various features of the convention proceedings will make this one of the banner conventions in the history of the Association.

Respectfully submitted, Homer E. Niesz, *Chairman.*

DISCUSSION.

The Chairman (F. W. Smith): I take it that it would be well to call for the discussion on each report as it is presented. I think the chairmen of the sections are entitled to that consideration rather than to have all of these reports presented and then discuss them in toto. All of us know what Chicago has done for the Electric Vehicle Association of America. Their work throughout the year has been particularly of that class which the electric men are able to produce when they put their shoulders to the wheel. Of special interest, I think, is the comment made in the first paragraph of this report as to the meetings having been held throughout the summer. We all know how hard it is to get even a half dozen men together on any particular business subject through the summer months, and Chicago, through perhaps considerable effort, has been able to keep up lively interest. I would like also to comment with regard to the Electric Vehicles magazine which Mr. Niesz mentions in his report. I think that publication should be given the support of this association and the individual members. There are two concrete ways of doing that: First, subscribe to the magazine, which every one interested in this society should do, and, second, support it in its advertising columns. I will call for the discussion on the report of the Chicago Section.

Mr. J. S. Codman: I would like to ask Mr. Niesz a little bit about the financial operations of the Chicago Section. Do you depend entirely upon the proportion of the dues turned back from the parent organization, or have you found it necessary to raise additional money in Chicago to carry on your local work?

Mr. Niesz: The Chicago Section has no other financial means than that obtained from its proportion of the dues paid into the Association from the Section. The other activities, such as the Orphans' Day outing affair, were contributed by private subscription from the members, and that did not come out of the

Association's fund. All the other expenses of the Section are paid out of our proportion of the membership fees.

MR. E. E. WITHERBY: I don't believe there is a more wide-awake bunch of what we might term boosters than the Chicago Section of the Electric Vehicle Association. There is the best of good feeling at all times. The weekly meetings are a great help and they promote the feeling of fellowship and the feeling of friendliness instead of one of acute antagonism which would find in so many lines and branches of trade. Take it all in all, the Chicago Section has done excellent work. It is only a little over a year old. I believe as an individual section we have more members than any of the others. We hope to see it still larger. We were really trying for a hundred for this meeting. We fell down just a little, some eight or ten, I believe, but the work of the Chicago Section has all been along the line of boosting for electric vehicles, first, last and all the time. If the passenger car people would only show half as much enthusiasm and get in the game as the truck boys have, it would be a whirlwind of a success; but these passenger car chaps kind of look on it now as a sort of truck association, as I have heard some of them say, because there are a lot of the boys in the truck business who are enthusiastic. Their enthusiasm seems to have no limit, and if we can only get the passenger car people to come half way across and join in that same helpful spirit of fellowship that characterizes all of those in the commercial car line, the Chicago Section is going to be bigger, it is going to be more prominent, and I almost feel that it will make the parent home section follow along instead of lead. I don't know why we shouldn't. There is only one other way to it, we will have to go and drag these passenger car people by the ears, as they say, and make them come across and get busy. The Association as a whole will never be a success without the hearty and wholesome co-operation of all, every minute. I believe that we here in Chicago have got the right spirit. We want to do the thing the right way, and I, as a representative of one of the truck manufacturing companies, feel that way all the time. We are doing everything we can to promote the general interest, the general welfare of electric vehicles all the time, everywhere, whether awake or asleep, as the saying is. I think the record that the Chicago Section shows as to members, as to the way they are handling their work every week, speaks well for the personnel of the section as a body.

MR. W. J. MCDOWELL: Mr. Chairman, when some one mentions the Chicago Section of the Electric Vehicle Association, it always feels like they are mentioning me, because I started this thing, and that is probably the reason why there are so many more truck men in it than there are passenger car men. Naturally, I know those men better and I thought that—I had a little selfish interest in it, of course, as every one does have—as I did know the truck men better it would be better for me and the rest of them, and so that is why I have urged them to come a little more strongly than I have urged the passenger car men. I want to take this occasion to straighten out a little rumor that has been circulated in Chicago that some of you don't understand. The city council suggested or proposed to cut down the period for standing in one place, whether a gasoline or electric car, from sixty minutes to thirty minutes. We heard about that and appointed a committee, of which I was a member, and we went over there to their sub-committee and we fought that thing down. We didn't get it stopped altogether, we simply got it held up so that the ordinance now stands the same as it did before, that a vehicle may stand for one hour. Now, in committee meeting one day I expressed my personal opinion that I thought an ordinance like that cutting down the time limit to thirty minutes would help the truck business through the crowded streets, because it would keep more vehicles moving and in that way wouldn't block the truck end of the business as much as it is being blocked now. Now, some one carried that report around and said that I was back of that movement and that I was trying to get the thirty minute ordinance through, which is absolutely wrong. I went over there and took a lot of time and fought it out with Mr. Lund and Mr. Peterson and today it stands just as it did before, one hour, and I don't think it will be cut down to thirty minutes as long as we have this section here.

THE CHAIRMAN: Is there any further discussion, gentlemen? I made a statement on the way from New York, to some one, that in my judgment in the course of time, with adequate garage facilities, the passenger vehicle would outstrip the commercial vehicle. I believe that that is so. I believe that if proper garage facilities were available throughout the country there are more individuals who would use the passenger vehicles than those who would use commercial vehicles. If that is so, it is just an opinion of mine which may be very far afield from the fact, but if there is anything in it we would like to hear some expression from the passenger representatives with regard to the work of the Chicago Section.

MR. E. E. WITHERBY: In reference to the remark of Mr. Smith as to the ultimate supremacy either in the point of number of vehicles or kilowatts or anything else that we want to figure, the passenger car end of the electric vehicle industry has only started. It is within less than two years that there seemed to be a feeling that the passenger car proposition was a glass box for a lady to ride around in and show her good clothes. That seemed to be as far as its limits of real usefulness went. Today you will find some of the best business men in the city of Chicago, and other cities, who are going to business every morning in a little electric brougham. It happened to be my luck this morning in coming down to the office to pass three cars on Lincoln boulevard, each one equipped with a chauffeur on the inside in livery; in two cases the gentlemen occupied the rear seat and in another case a lady and gentleman. It shows that the head of the house was coming to business in his electric passenger car. Now, with the advent of inclement weather this closed electric brougham is brought into more daily prominence. It is comfortable, it is clean, it is quick, it is convenient in every way, and if the passenger people make one-half of the strenuous efforts to put their cars in the market that the commercial car people are doing today the number of electric pleasure cars, or passengers cars, properly called, will more than double in the next twelve months in Chicago. Now, that is perhaps a broad statement, but I am just as thoroughly convinced that I am right as I am standing here. The truck people are down to a point of going after the business, because they can convince the man that it is necessary for his business to have what they want to sell. The passenger car people almost to a man up to the present time have tried to convince first the lady of the house that it was what she wanted. In the end it has finally got around to the man with the pocketbook, who has been persuaded more by her than by the salesman to buy. The commercial car people, on the other hand, have got to convince the hard-headed business man that it is a thing he must have to do business with. There is just as much chance—there is more chance—to convince that same business man that the passenger car is a necessity for him as much as it is for the lady of the house, if not more so. Personally, I use one every day. I believe it is the most convenient and best way of getting around to do business that there is at hand. I wouldn't be without it. The passenger car man has not gone out to convince the hard-headed business man up to date. He is coming to it just as sure as you are living, just the same as the commercial car man has. A week ago last Thursday evening an owner of one of the largest electric garages in this city told me he honestly believed that within ten years you wouldn't see a gasoline commercial car in the entire loop district unless it was a long-distance car that came in from out of town. He says inside of ten years every bit of hauling will either be by the poor horse with the poor truckman or else for some other reason not against electricity; all other business will be practically in the hands of the electric truck and, he says, "I, for one, am going to get in the game, going to get ready for it." Now, that is from the people in the garage business who are interested simply incidentally. We are interested in the sales, in getting them going; and the electric light company is interested in the kw. output that they are going to sell, and I believe it is the hope of the Commonwealth Edison Company in this city, and I think they are planning on it, that inside of ten years from seventy-five to eighty per cent of the commercial delivery freight house work, intra-plant hauling and things of that nature are all going to be done electrically, and the increased use of the electric truck is really going to be so large that it will be enormous, and the next three or four years will develop that line of action and inside of ten years I believe our friend, the garage man, will be just about right and you will hardly see a horse in the loop district.

REPORT OF THE NEW ENGLAND SECTION.

DURING the past year the New England Section has instituted several new lines of endeavor, which have made it particularly valuable to the electric-vehicle field in its territory. Among these have been a sales and advertising convention, with delegates from ten states, the employment of a permanent business secretary, the organization of a campaign among central stations in the interests of the electric vehicle and activities along legislative lines.

The membership is at present 79, consisting of 13 active members and 66 associate members.

During the past year five meetings were held, the subjects and principal speakers being as follows:

"The Advantages of the Electric Vehicle." Arthur Williams, president of the Electric Vehicle Association of America.

"Characteristics of the Edison Battery." H. H. Smith, Edison Storage Battery Company.

"Characteristics of the Lead Battery." John W. Cooke, Electric Storage Battery Company.

"Methods of Charging Batteries." R. E. Russell, General Electric Company.

"Tires for Electric Vehicles." J. E. Hale, Goodyear Tire and Rubber Company.

The sales and advertising convention, held last May, consisted of two days, full of interesting papers and discussions by leaders in their respective fields, and has been of great value in stimulating the interest in the electric. In addition to the New England states, Chicago, New York, Philadelphia, Cleveland, Baltimore and other cities were strongly represented.

Envelope stuffers, outlining the value of the electric vehicle, have been prepared and are furnished in large quantities to central stations for use in mailing to prospects.

The section took a leading part in securing the dismissal of the Massachusetts motor truck fee bill, which endeavored to secure a greatly increased registration fee for trucks, both electric and gasoline. Although twice reported by the joint committee, endorsed by the Massachusetts Highway Commission and passed by the Senate, it was defeated in the House by a vote of 126 to 66.

The section has worked shoulder to shoulder with the Electric Motor Car Club, joining with it in the convention and legislative work, and co-operating in every way to increase interest in the electric vehicle.

During the past year the officers were Fred M. Kimball, chairman; E. S. Mansfield, vice-chairman, and Leavitt L. Edgar, secretary-treasurer. At the annual election J. A. Hunnewell was elected chairman, the other officers remaining the same.

The approaching year should be the most important in the section's history. An aggressive membership campaign, covering all New England, is soon to be launched, while meetings of the section will be held in various cities, in order to aid the respective central stations in their campaign for the electric. There are now registered in the six states more than 1,600 electric vehicles, and conservative estimate places the number, at the end of another year, at upwards of 2,200.

Respectfully submitted, L. L. Edgar, *Secretary*.

REPORT OF THE ELECTRIC MOTOR CAR CLUB OF BOSTON.

SINCE its inception in the spring of 1911 the Electric Motor Car Club of Boston has been a strong factor in the sale of electric vehicles in the New England territory. The membership includes representatives of manufacturers of electric trucks, electric passenger cars, storage batteries, automobile tires, motors and other accessories; representatives of central stations, garage owners, the press and private owners. All are working together to promote the adoption and use of electric motor cars for business and pleasure purposes.

Under the title of the Electric Vehicle Club of Boston, the organization was formed on April 26, 1911, as a result of suggestions at a dinner tendered by the Edison Electric Illuminating Company of Boston to about forty electric vehicle dealers on April 3. At this meeting the Boston Edison Company announced its $100,000 advertising campaign on behalf of electric motor cars. Weekly meetings of the club were held throughout the fall of 1911 and the spring of 1912 at the Edison Company's building, luncheon being served by the company.

By the fall of 1912 the club's activities had developed to such a stage that a self-supporting organization was possible. Consequently, at a meeting held November 14, 1912, a formal constitution was adopted and the name of the club changed to the Electric Motor Car Club of Boston.

By this constitution the annual dues of official representatives of companies who derived an income resulting from the sale of electric vehicles were placed at $10.00; the annual dues of additional representatives of these companies were $3.00; the annual dues of owners and operators of electric vehicles were placed at $2.00. The officers consisted of a president, vice-president, secretary and treasurer, and the standing committees are executive, advisory, meetings, finance, membership, publicity and civic relations. Special committees are appointed from time to time.

From December 1, 1912, to July 30, 1913, regular club meetings have been held at approximately bi-weekly periods. The meetings were usually preceded by a dinner. The dates of the meetings were arranged so as to fall on the same nights as the monthly meetings of the New England Section of the Electric Vehicle Association of America. On such evenings the meeting was devoted entirely to discussion of club affairs, so that an early adjournment allowed members to attend the meeting of the section. At several of the other meetings addresses upon pertinent electric vehicle topics were presented. Attendance at the meetings has been as large as 85. In addition, the executive committee has held frequent meetings to discuss the club's work.

One of the early actions of the publicity committee was the issuance of an atractive booklet, giving the purposes of the club, lists of officers, committees and members, and also the constitution and by-laws. This booklet has been of considerable assistance to the membership committee in soliciting new members.

On January 28 the club gave a theater party, which was attended by a large number of officials of the executive, police and fire departments of the cities and towns within the club's territory. Special arrangements were made whereby there were exhibited on this evening moving pictures of the electric vehicle parades held under the auspices of the club on Memorial days of 1911 and 1912.

At the meeting on February 13 it was decided to employ a business secretary, who should devote his entire time to the exploitation of the electric vehicle, it being arranged that he should work for the interests of the New England Section of the Electric Vehicle Association, as well as those of the Electric Motor Car Club. The business secretary has devoted himself largely to the working up of newspaper advertising upon the electric vehicle. He also assists the various standing committees in the conduct of their work.

When the club was reorganized in November it was intended to include all electric vehicle interests in greater Boston. At a meeting in March it was decided to extend the club's scope to include the territory within 50 miles of Boston. This action has been instrumental in interesting in electric vehicles a number of electric light companies outside of Boston. The original membership of the old Electric Vehicle Club was 15. The membership of the present club in February, 1913, when the business secretary assumed office, was 83. The membership on August 1, last, was 118. Of this latter number seven are car owners. During the coming season a number of special meetings for private owners will be held and a rapid growth of this class of membership is anticipated.

On May 20 and 21 there was held, under the joint auspices of the New England Section of the Electric Vehicle Association and the Electric Motor Car Club a New England convention of central stations, electric vehicle manufacturers and allied interests. The total registration at the convention was 144, of whom 23 were from without New England. Eight live papers upon electric vehicle topics were presented and discussed, and the convention resulted in strengthening the spirit of co-operation between the New England central stations and the electric vehicle representatives of their respective territories.

During the past year the club members have done a large amount of newspaper advertising of both individual and co-operative types. One series of co-operative advertisements appeared in the Boston *Transcript* on Saturday evenings during April and May. These advertisements were signed by the club and inquiries were forwarded to the several dealers participating in the advertisement. During June, July and August the club members have advertised on alternate weeks in selected papers, these advertisements appearing at the same time as special electric vehicle advertisements of the Boston Edison Company. An advertising schedule for the coming fall has already been adopted by the publicity committee, who expect there will be a full page devoted to the electric vehicle in at least one paper every other week.

On July 16 the club held its second Electric Vehicle Field Day at the New England Kennel Club, as guests of the Boston Edison Company. The Edison Company announced at this time the presentation of a loving cup to be played for in baseball games at future club outings.

A list of all charging stations in New England is kept up to date by means of correspondence and personal calls by various club members. There are at present 142 regular stations included in the list, as well as 76 stations where emergency charges may be obtained. This list is kept at the office of the business secretary, together with lists of electric vehicle owners throughout New England. A bi-weekly list of electric vehicle registrations is sent to all member firms.

There was introduced at the 1913 session of the Massachusetts State Legislature a bill, No. 484, which called for a radical increase of the registration fees for commercial automobiles operating in the state. The club members felt that the proposed increase was unjust. The officers of the club were active, along with representatives of other automobile associations, in opposing this bill, which passed the Senate, but was lost in the House by a vote of 126 to 66. The club's committee on civic relations is now co-operating with all automobile associations in Massachusetts to effect a joint organization which will safeguard the interests of motorists.

The results of the concerted advertising and co-operative efforts which have been fostered by the club are indicated by the comparative figures of electric vehicle registrations in Massachusetts on August 9, 1912, and August 9, 1913, as given following:

NUMBER OF CARS.

	1912.	1913	Gain	% Gain
Passenger	425	557	132	31.
Commercial	210	384	174	82.8
Total	685	941	306	48.

In the successful conduct of its work in exploiting the electric vehicle, the club is deeply indebted to both President Edgar and General Superintendent Atkins of the Boston Edison Company, who have won the firm support of every club member through their unswerving support of the electric vehicle. Through the continued hearty co-operation of all the electric vehicle interests in and around Boston, as represented by the club's membership, it is anticipated that the popularity of the electric vehicle will continue to grow even faster than represented by the increase in registrations during the past year.—DAY BAKER, *President;* EDWARD S. MANSFIELD, *Vice-President;* H. F. THOMSON, *Secretary;* J. S. CODMAN, *Treasurer.*

DISCUSSION.

MR. DAY BAKER: I might say in connection with this feature we have advertised among users of electric vehicles that in case they desired assistance on the road if they will call our telephone we will immediately inform them as to the nearest charging station, either public or emergency, where they can go for current or necessary assistance.

THE CHAIRMAN: These two reports, gentlemen, the one on behalf of the New England Section and the one on behalf of the Electric Motor Car Club of Boston, are now before you for discussion.

MR. HOMER NIESZ: Mr. Chairman, I would like to ask what is the particular reason for having two organizations in one section which are apparently doing quite similar work and covering very much the same field? Why couldn't they be combined into one large organization, which would possibly be more effective than two?

MR. MARSH: I might answer Mr. Niesz by saying one is strictly local and the other is a New England organization; one has to do particularly with the local electric light company and the local dealers and the manufacturers' branches of which there are some twenty odd in Boston, and its function and its work are a little different from the New England Section of the national organization.

THE CHAIRMAN:—I might ask if that particular point has been discussed as between the two organizations in Boston?

MR. DAY BAKER:—Mr. Hunnewell and I might rise and say in concert that it has. We already have the matter under discussion, but it seems to many of us that the function of the Electric Motor Car Club is purely local, it is confined almost entirely to the Edison district, and it is being pushed forward in the interest of electric vehicle manufacturers and the users of vehicles as well as the special electric light company and, therefore, for the present it has seemed to some of us that the club should continue to work along lines which the association cannot well do. And then there is another thing; we need the money and by having two separate organizations we can have two sets of dues, which is a very desirable thing. Anyone who has had the treasurer's chair realizes the necessity of money when he has to pay the bills. By doing this we can get two sets of dues.

MR. MANSFIELD:—In defense of this duplication of organizations I would simply like to state that we have a sort of understanding between the two associations that they will not duplicate one another's work, so that where one part of the work is to be done by a section either one or the other will take care of it, so that we really do more work with less money than we would if we only had the one.

MR. MARSH:—I should like also to add for Mr. Niesz's benefit there that that has resulted in all the local dealers' and manufacturers' branches, the passenger car people that Mr. Witherby talked about, being all represented; every one of them comes into the local club.

REPORT OF THE NEW YORK ELECTRIC VEHICLE ASSOCIATION.

THE New York Electric Vehicle Association has existed since September 11, 1912, having come into being at that time at the suggestion of Mr. Arthur Williams of the New York Edison Company. Not losing sight of the good work of the Electric Vehicle Association of America and the monthly meetings held in New York City, it was felt by Mr. Williams that local electric vehicle interests should get closer together and establish an auspices under which movements of purely local character could be conducted.

The New York Association is a stock corporation with a stock issue of $50,000. Its purpose is, briefly, to purchase, sell, operate, let for hire, repair, maintain, store and care for electric automobiles; to act as agent or representative of corporations, firms and individuals, and, as such, to develop and extend the business of firms, corporations or individuals manufacturing electric automobiles and accessories.

At the present writing Mr. Williams is president of the association and Mr. W. P. Kennedy vice-president. Serving on the board of directors are representatives of each electric vehicle manufacturer offering his product for sale in New York City. An associate membership has been established in which are numberet all local representatives of vehicle and accessory manufacturers, all garage men and all users of passenger or commercial electrics. Any New York man interested in electrics may bring his problems to the New York association for assistance, advice or solution.

One of the first committees appointed by the president was that on co-operative advertising and publicity. The work of this committee becomes evident in its title.

A committee on charging stations keeps in touch with such stations in and around New York, establishes new stations where needed, and publishes in booklet form a list of charging stations within a radius of 100 miles of New York City. This book is distributed without charge to such electric vehicle people as may need the information contained.

A committee on traffic and service runs arranges electric vehicle parades and other public demonstrations or contests, establishes parking spaces in shopping, hotel and theater districts, and, where necessary, discusses and recommends changes in the city's traffic regulations.

A committee on operating costs investigates, compiles and makes ready for distribution to the public tables indicating comparative costs of horse, gasoline and electric vehicle operation.

A committee on legislation keeps in touch with all city ordinances and proposed new bills brought up from time to time in the legislative bodies.

Another committee has been seeking to establish a co-operative garage and service station, to be supported, as is indicated, by all local electric vehicle interests. It is felt by this committee that the establishment of improved and reliable garaging facilities would materially increase the sale of electric cars in New York City. A fund of $30,000, payable in three yearly installments, has been appropriated by the New York Edison Company for the use of this committee. Though the selection of a site and plan of procedure satisfactory to all interests is difficult, the committee has been earnestly at work during the past six months, and is now nearing the time when the project begins to take tangible form.

In all, the New York Electric Vehicle Association exists for the purpose of bringing about closer co-operation and affording a headquarters to which selling and operating difficulties may be brought for study and solution.

Harvey Robinson, *Treasurer.*

DISCUSSION.

The Chairman:—I will ask Mr. Williams, the president, to say a few words in opening the discussion with regard to this section of the report.

Mr. Williams:—So much has been said upon the subject of local organizations already that I hardly need add a word. It seems that the national Association does not specifically cover a local territory like New York as thoroughly as it ought to be covered. We therefore thought the best way would be to organize this local association under one of the New York state laws, providing for that sort of thing where money is to be raised and expended and property acquired, and that was done during the year. Part of the plan of the Association is to get and conduct a model garage, partly in the hope, if not largely, that its experience in conducting this garage will show to others that other garages may be conducted purely for the electric machine and operated at a profit. Another part of the plan is that with a large central garage as headquarters a great many small or sub-garages may be started around the city so as to better serve the local service rather than call for long mileage from distant points to this main garage. Still another plan is to conduct there a school, possibly a branch of the New York Edison Company school, which is in turn a branch of the national association of schools, or perhaps to conduct there an automobile school as a branch of the larger body. We hope in that connection to soon get the entire floor of the Forty-second Street building and there to have a model shop with machine tools and other tools necessary to properly carry on the work, and to establish eventually perhaps a one or a two years course under the auspices of the local association for the purpose of training traffic engineers, battery men, model garage men, and I hope also drivers in the better care of our machines. The whole thought, as Mr. Robinson has so ably said, is to have a local organization which may apply locally and to the highest degree of attainable efficiency the broader work which our national Association is doing.

Care Saves Tire Trouble

"One-half of the enjoyment of touring is immunity from tire troubles," says L. C. Rockhill, manager automobile tire department, the Goodyear Tire and Rubber Company, Akron, Ohio.

"The average owner-driver can enjoy this immunity by exercising care in making his preparations. Blowouts, punctures and other tire troubles are hold-ups that he looks forward to with no degree of enjoyment, whereas a little preparation in the way of accessories for temporary repairs obviates unnecessary delay.

"In the first place, he should be sure that his castings and tubes are in good condition and that he has an extra supply of both. Then, with a good air pump, a tire gauge to test the air pressure in his tires and a supply of tire repair devices, he can go on his way confident that he has taken every precaution to sidestep tire troubles. He will find that thus prepared the tour will be more enjoyable both for himself and his party."

Department Stores Employ Electric Trucks

The electric truck is a prominent element in the department stores delivery service of Boston, Mass. Wise-Smith & Co. operate four trucks of from 750 to 2,000 lbs. capacity. The 750 lb. wagon recently ran 531 miles in one week, displacing six horses in this work, and taking the place of two regular routes and one special delivery route. The 2,000 lb. truck makes 30 miles a day in furniture delivery. The Boston Branch Grocery, the Eagle Dye Works, the Sage & Allen Department store, and the grocery house of Tucker & Goodwin, are among the larger users of the electric vehicle. The great number of electric commercial cars in service in this vicinity is one of the many demonstrations of this successful method of obtaining efficient delivery.

Electric Has Bright Future

"It will not be many years," states Penrose Reed, sales-manager of the Chicago Electric Car Company, "before the number of electric pleasure cars will be greater in number than the gas cars. In the last few years marvelous refinements have been made in electric vehicles. The public now knows just what the electric car will do. Its mechanism is comparatively simple and the day to day economy is an item that reaches large proportions at the end of a year."

Registration List of the E. V. A. Convention

Members and Guests Who Attended the Chicago Meeting October 27th and 28th

REGISTRATIONS of members, guests and friends at the fourth annual convention of the Electric Vehicle Association of America reached a total of 360. The complete list of names is reproduced here in alphabetical order:

Andrews, G. W., Foraker Manufacturing Co., 1638 Wabash Av., Chicago.
Arlington, D. C., Philadelphia Storage Battery Co., 2612 S. Wabash Av., Chicago.
Aplin, Ben J., New York Edison Co., 9 Dock St., Yonkers, N. Y.
Anderson, L. C., Middleton Gest Electric Co., Middleton, Ohio.
Andrews, W. C., Edison Storage Battery Co., Orange, N. J.
Armstrong, A., Jr.
Atkin, W. Godfrey, Electric Storage Battery Co., 613 Marquette Bldg., Chicago.
Ashley, L. E., Chicago Mirror & Art Glass Co.
Armstrong, Frederick W., Chicago Association of Commerce, 10 S. LaSalle St., Chicago.
Avichouser, Charles H., Commonwealth Edison Co., Chicago.
Buchanan, W., General Electric Co., Chicago, Ill.
Bartlett, E. J., Baker Motor Vehicle Co., Cleveland, Ohio.
Baker, Day, General Vehicle Co., 84 State St., Boston, Mass.
Blizard, Charles, Electric Storage Battery Co., Philadelphia, Pa.
Butler, C. S., Public Service Corporation, 84 Sip Av., Jersey City, N. J.
Butler, H. J., 229 S. Wabash Av., Chicago.
Brooks, E. W., Foraker Mfg. Co., Chicago.
Brechtel, A. J., General Vehicle Co., Minneapolis, Minn.
Bushnell, S. Morgan, Commonwealth Edison Co., Chicago.
Bee, W. G., Edison Storage Battery Co., Orange, N. J.
Benson, A., Klingelsmith Electric Truck Wks., 2009 W. 34th St., Chicago.
Beal, Walter B., P. S. Electric Co., Paterson, N. J.
Bieneman, W. C., Gutler, Lockwood & Johnson, City Hall Square bldg., Chicago.
Blankoad, F. C., Firestone Tire & Rubber Co., Akron, O.
Bowling, E. B., Firestone Tire & Rubber Co., Akron, O.
Berry, M. R., Electric Products Co., 1051 Dupont Av., Cleveland, O.
Brennan, J. W., Edison Illuminating Co., Detroit, Mich.
Blackman, C. W., *Commercial Vehicles*, New York.
Grand Boulevard Garage, Chicago, Ill.
Baird, R. P., Electric Storage Battery Co., 613 Marquette Bldg., Chicago.
Baechl, L. F., Goodyear Tire & Rubber Co., 179 N. Michigan Av., Chicago.
Babcock, C. W., Buffalo Electric Vehicle Co., Buffalo, N. Y.
Bell, Harold, Woods Motor Vehicle Co., 2500 Cottage Grove Av., Chicago.
Boos, F. E., Gould Storage Battery Co., The Rookery, Chicago.
Blocker, A. D., Commonwealth Edison Co., Chicago.
Bailey, E. H., General Electric Co., 939 Monadnock Bldg., Chicago.
Baehr, Herman C., Rauch & Lang Carriage Co., Chicago.
Baldwin, O. K., Kankakee, Ill.
Babcock, Guilford C., Van Auken Electric Car Co., 222 N. Wabash Av., Chicago.
Bennett, William R., Anderson Electric Car Co., Peoria, Ill.
Bracken, E. F., Commonwealth Edison Co., Chicago.
Baker, Frank J., Public Service Co. of Northern Ill., Chicago.
Blakesen, C. J., Chicago Electric Motor Car Co., 3612 S. Morgan St., Chicago.
Balrock, F. A., Buffalo Electric Vehicle Co., Buffalo, N. Y.
Buttley, Wilton, River Forest, Ill.
Boyd, Alexander A., Michigan City, Ind.
Bird, Paul P., Commonwealth Edison Co., Chicago.
Bennet, I. F., Commonwealth Edison Co., Chicago.
Bush, J. M., Broc Electric Vehicle Co., 2515 Michigan Av., Chicago.
Carle, F. Nelson, General Vehicle Co., Long Island City, N. Y.
Collins, L. W., Vesta Accumulator Co., 2100 Indiana Av., Chicago.
Crew, M. W., Insurance Exchange, Chicago.
Chandler, E., General Motor Truck Co., Decatur, Ill.
Chilcott, W. K., Pontiac, Mich.
Creager, F. C., Westinghouse Elec. & Mfg. Co., 39 S. LaSalle St., Chicago.
Campe, H. A., Westinghouse Elec. & Mfg. Co., 39 S. LaSalle St., Chicago.
Cutting, E. M., Edison Storage Battery, 818 Mission St., San Francisco, Cal.
Crumpton, William J., D. C. & Wm. B. Jackson, Harris Trust bldg., Chicago.
Callahan, E. L., H. M. Byllesby & Co., Chicago.
Cohn, H. B., Anderson Elec. Car Co., Chicago.
Case, R. H., Anderson Elec. Car Co., Chicago.
Conant, W. H., Gould Storage Battery Co., 999 Woodward Av., Detroit, Mich.
Codman, J. S., S. R. Bailey & Co., Inc., 895 Boylston St., Boston, Mass.
Clayton, W. G., Roanoke Ry. & Elec. Co., Roanoke, Va.
Cummings, A. H., B. F. Goodrich Co., Akron, Ohio.
Cox, William A., 759 Broad St., Newark, N. J.
Core, Guy C., *Chicago Journal.*
Cory, Fred C., Commonwealth Edison Co., Chicago.
Curtis, Levi B., Macomber Motor Co., 235 Aliso St., Los Angeles, Cal.
Cole, G. K., General Motors Truck Co., 2241 S. Wabash Av., Chicago.
Chandler, Elkin, General Motors Truck Co., Decatur, Ill.
Corliss, S. T., Public Service Electric Co., 410 Federal St., Camden, N. J.
Cox, Newton, Baker Motor Vehicle Co., 2023 Michigan Av., Chicago.
Corlett, John D., *Building Trades Exchange*, 844 Sheridan Road, Chicago.
Chapin, C. L., Memphis Consolidated Gas & Elec. Co., Memphis, Tenn.
Casey, B. L., Commonwealth Edison Co., 120 W. Adams St., Chicago.
Carroll, Lawrence J., *Electrical Record,* Chicago.
Dougherty, T. H., General Electric Co., Monadnock bldg., Chicago.
Draper, O. G., New England Section E. V. A., 39 Boylston St., Boston, Mass.
Dumont, R. D., New York Edison Co., New York.
Dowd, W. J., Toledo Railroad & Light Co., Toledo, Ohio.
Dean, John S., Longwood, Ill.
Denasey, F. W., Gould Storage Battery Co. of Ill., 223 E. 22nd St. Chicago.
Dwyer, J. J., Chicago, Ill.
Delany, James H., Commonwealth Edison Co., Chicago.
Eames, Hayden, Euclid Heights, Cleveland, Ohio.
Ehrlich, Howard, *Electrical Review,* 608 S. Dearborn St., Chicago.
Ekstrand, Roy H., Commonwealth Edison Co., Chicago.
Everett, William R., B. G. & M. Mfg. Co., Franklin & Ohio Sts., Chicago.
Eddy, William, Woods Motor Vehicle Co., Chicago.
Elliott, A. D., 6050 Jackson Park Av., Chicago.
Emery Motor Car Co.
Ferguson, Louis A., Commonwealth Edison Co., Chicago, Ill.
Ford, Bruce, Electric Storage Battery Co., Philadelphia, Pa.
Foraker, J. P., Foraker Mfg. Co., 1618 Wabash Av., Chicago.
Foster, George B., Commonwealth Edison Co., Chicago.
Fitch, Morton J., Gen. Elec. Co., West Lynn, Mass.
Frank, Paul, Anderson Elec. Car Co., Chicago.
Firestone, Charles E., Columbus, Ohio.
Freeman, G. A., Walker Vehicle Co., 531 W. 39th St., Chicago.
Firestone, R. J., Firestone Tire & Rubber Co., Akron, Ohio.
Fitzgerald, William, Firestone Tire & Rubber Co., 1920 Michigan Av., Chicago.
Frayer, C. B., Edison Storage Battery Co., 229 S. Wabash Av., Chicago.
Follansbee, R. C., Commonwealth Edison Co., Chicago.
Frazer, Edwin, General Motors Truck Co., 2241 S. Wabash Av., Chicago.
Fox, Edwin H., H. S. Rich & Co., 431 S. Dearborn St., Chicago.
Field, C. H., Field Omnibus Co., New York.
Farrington, Henry, *The Power Wagon,* Chicago.
Freeman, W. W., Union Gas & Electric Co., Cincinnati, Ohio.
Gunter, Edward A., General Vehicle Co., 30 E. 42nd St., New York, N. Y.

Guy, H. B., Electric Storage Battery Co., Cleveland, Ohio.
Gray, A. A., *Electrical Review,* 608 S. Dearborn St., Chicago.
Grannis, U. B., Borland-Grannis Co., 310 E. Huron St., Chicago.
Goldman, Albert, New York Edison Co., 149th St. & 3rd Av., New York.
Gurtler, Fred H., Gurtler, Lockwood & Johnson, City Hall Square bldg., Chicago.
Garhet, J. H., Commonwealth Edison Co., Chicago.
Greenwelch, William, Chicago Electric Motor Car Co., 1013 Davis St., Chicago.
Glass, John, *Manufacturers' Record* of Baltimore, Chicago.
Griefen, R. R., Woods Motor Vehicle Co., 2500 Cottage Grove Av., Chicago.
Griffin, Herbert E., Wagner Electric Mfg. Co., 1624 Marquette bldg., Chicago.
Goetz, Albert, 416 Briar Pl., Chicago.
Gloeckler, Charles, Chicago Mirror & Art Glass Co., 216 N. Clinton St., Chicago.
Gilchrist, John F., Commonwealth Edison Co., 120 W. Adams St., Chicago.
Gale, Frank H., General Electric Co., Schenectady, N. Y.
Gardner, Stephen, Westinghouse Electric & Mfg. Co., Chicago.
Gorham, John S., General Vehicle Co., 612 Otis Bldg., Chicago.
Hunnewell, J. A., Lowell Electric Light Co., 50 Central St., Lowell, Mass.
Hewett, Henry B., Kentucky Wagon Mfg. Co., Louisville, Ky.
Harris, R. H., Firestone Tire & Rubber Co., Akron, Ohio.
Harding, J. V., Motz Tire & Rubber Co., Akron, Ohio.
Hebberd, J. L., Century Electric Car Co., Detroit, Mich.
Holland, Walter E., Anderson Electric Car Co., Detroit, Mich.
Hood, P. W., Erickson Companies, 1347 Michigan Av., Chicago.
Hayden, B. R., Chicago Electric Motor Car Co.
Henderson, C. T., Cutler Hammer Mfg. Co., Milwaukee, Wis.
Hampson, J. M. C., *Popular Electricity,* Chicago.
Hurlburt, Ray R., General Electric Co., Lynn, Mass.
Holroyd, W. F., Polack Tire & Rubber Co., 1344 Michigan Av., Chicago.
Hatfield, C. F., Panama Pacific Exposition, 917 Ashland block, Chicago.
Hill, I. M., Seattle, Wash.
Hale, James E., Goodyear Tire & Rubber Co., Akron, Ohio.
Hull, Robert C., Gould Storage Battery Co., 30 E. 42nd St., New York.
Howard, Dana H., Commonwealth Edison Co., Chicago.
Hungsley, H. J., Elite Garage, 5130 Lake Av., Chicago.
Hill, W. C., Public Service Co., Joliet, Ill.
Herriman, L. C., Badt Westburg Electric Co., 1104 Monadnock Bldg., Chicago.
Halla, V. G., Anderson Electric Car Co., 2416 S. Michigan Av., Chicago.
Haase, A. L., Advertising Manager, Electric Vehicles, 1460 Monadnock Bldg., Chicago.
Harris, S. C., New York Edison Co., 32 Horatio St., New York, N. Y.
Hincher, William W., Albert & J. M. Anderson Mfg. Co., 105
Holdsworth, P. M., Walker Vehicle Co., 531 W. 39th St., Chicago.
Iles, M. J., Polac Tyre & Rubber Co., Kansas City, Mo.
Jackskon, Elmer W., Denver Gas & Electric Light Co., 900 15th St., Denver, Colo.
Jones, George H., Commonwealth Edison Co., Chicago.
Judd, H., Public Service Co., 114 N. Oak Park Av., Chicago.
Jackson, William B., D. C. & W. B. Jackson, Chicago.
Junkersfeld, P., Commonwealth Edison Co., 120 W. Adams St., Chicago.
Jackson, A. O., Gould Storage Battery Co. of Ill., The Rookery, Chicago.
Johnson, Wilbur C., Waverley Co., Indianapolis, Ind.
Keily, W. E., *Electrical World,* 1570 Old Colony bldg., Chicago.
Kelly, George H., Baker Motor Vehicle Co., Cleveland, Ohio.
Krohn, John, Walker Vehicle Co., 531 W. 39th St., Chicago.
Klingelsmith, J. M., Electric Trucks, 2009 W. 34th St., Chicago.
Kershaw, W. E., Electric Storage Battery Co., Philadelphia, Pa.
Kinny, Clinton H., Chicago Electric Motor Car Co.
Kline, Harry E., Commonwealth Edison Co., Chicago.
Kraus, Samuel, Stewart-Warner Speedmotor Co., Chicago.
Kimes, H. C., Edison Storage Battery Co., 229 S. Wabash Av., Chicago.
Kelly, Earl D., Electric Storage Battery Co., 613 Marquette bldg., Chicago.
Kehew, H. T., Middletown Gas & Electric Co., Middletown, Ohio.
Kerrison, J. C., *Boston American,* Boston, Mass.
Kennedy, William P., 1790 Broadway, New York.
S. Dearborn St., Chicago.
Laub, C. R., Public Service Co., Streator, Ill.
Luther, George D., Electric Storage Battery Co., Denver, Colo.
Lloyd, E. W., Commonwealth Edison Co., Chicago.
Liston, E. P., Public Service Co., 1868 Bissell St., Chicago.
Lutzon, F. H., Klingelsmith Electric Truck Wks., 2009 W. 34th St., Chicago.
Leggett, W. S., General Electric Co., Cincinnati, Ohio.
Lloyd, M. G., *Electrical Review & Western Electrician, Chicago.*
Luckey, C. A., Edison Storage Battery Co., 229 S. Wabash Av., Chicago.
Lloyd, R. Louis, Philadelphia Electric Co., 133 S. Grove Av., Oak Park, Ill.
Lyons, J. P., Electric Products Co., 1306 Marquette bldg., Chicago.
Langfeld, C. M., General Electric Co., 941 Monadnock bldg., Chicago.
Lewis, D. B.
Lull, Ralph M., Commonwealth Edison Co., Chicago.
Long, Frank E., *Harper's Review,* 539 S. Dearborn St., Chicago.
Little, William C., Borland Grannis Co., 310 E. Huron St., Chicago.
Lunn, Ernest, Walker Vehicle Co., 531 W. 39th St., Chicago.
Lincoln, H. L., Chicago Central Station Institute, 72 W. Adams St., Chicago.
Learned, John J., Public Service Company of Northern Illinois, Chicago.
Lukes, George D., Public Service Company of Northern Illlinois, Chicago.
Lyon, H. S., Cutler Hammer Mfg. Co., Milwaukee, Wis.
McKinney, C. C., *Commercial Star Journal,* Chicago.
Milton, Taliaferro, Electric Storage Battery Co., 613 Marquette bldg., Chicago.
Morsbach, John W., Lake View Garage Co., 2856 Broadway, Chicago.
Mainwaring, W. A., Philadelphia Electric Co., 1208 N. 31st St., Philadelphia, Pa.
Macrae, D., Commonwealth Edison Co., Chicago.
McKeough, J. D., General Motor Truck Co., Chicago.
McLaren, S. J., Carson, Pirie, Scott & Co., Chicago.
Marsh, Charles M., Potomac Electric Power Co., 231 14th St., Washington, D. C.
McDonald, E. A., Anderson Electric Car Co., Chicago.
Martins, C. W., Jr., Goodyear Tire & Rubber Co., Akron, Ohio.
Marsh, C. D., Edison Electric Illuminating Co. of Boston, 15 Spruce St., New York.
Miles, Charles H., Edison Co., 39 Boylston St., Boston, Mass.
Meissner, L. F., Edison Storage Battery Co., 229 S. Wabash Av., Chicago.
McJunkin, William D., W. D. McJunkin Advertising Agency, Chicago.
McKinney, C. C., Chilton Co., Philadelphia, Pa.
Mauer, Fred A., Electric Products Co., 1307 Marquette bldg., Chicago.
Merkle, James, Walker Vehicle Co., 6411 University Av., Chicago.
Miller, William J., Public Service Electric Co., Newark, N. J.
Mock, Ed. J., publisher Electric Vehicles, Monadnock Bldg., Chicago.
Miles, Charles H., Edison Electric Illuminating Co. of Boston, Mass.
Myers, Clyde J., McDuffee Auto Co., 2457 S. Michigan Av., Chicago.
Millett, W. M., Western United Gas & Electric Co., Aurora, Ill.
McDuffee Automobile Co., 2457 Michigan Av., Chicago.
McMahon, C. C., Commonwealth Edison Co., Chicago.
McCall, F. E., Commonwealth Edison Co., Chicago.
Moore, A. W., Firestone Tire & Rubber Co., 1920 Michigan Av., Chicago.
McDowell, W. J., General Motors Truck Co., 2241 S. Wabash Av., Chicago.
McGiehan, T. H., Motz Tire & Rubber Co., Akron, Ohio.
Meltz, F. B., Electric Storage Battery Co., Philadelphia, Pa.
Mansfield, E. S., Edison Electric Illuminating Co. of Boston, Mass.
Nourse, F. M., Public Service Co. of Northern Illinois, Chicago.
Neth, George, 333 W. 35th St., Chicago.
Niesz, Homer E., Cosmopolitan Electric Co., Chicago.
Norton, S. V., B. F. Goodrich Co., Akron, Ohio.
Neumeister, H. J., Fashion Auto Station, 51st St. and Cottage Grove Av., Chicago.
Oliver, C. B., Commonwealth Edison Co., Chicago.
Orne, F., Dubuque Brewing & Malting Co., Dubuque, Iowa.
Olsen, George A., *Material Record,* 1827 Prairie Av., Chicago.
Pierson, Hubert A., Commonwealth Edison Co., Chicago.
Peterson, Robert W., Commonwealth Edison Co., Chicago.
Peterson, R., Commonwealth Edison Co., Chicago.
Parker, Reed L., Chicago *Tribune,* Chicago.

Phillips, Stanley A., *The Power Wagon,* Chicago.
Parker, D. B., Electric Storage Battery Co., 613 Marquette bldg., Chicago.
Pierce, John A., Commonwealth Edison Co., Chicago.
Powers, W., General Motors Truck Co., 2241 S. Wabash Av., Chicago.
Pinkley, O. M., General Motors Truck Co., 2241 S. Wabash Av., Chicago.
PenDell, C. G., Public Service Co. of Northern Illinois, Chicago.
Perry, Allen M., 1570 Old Colony Bldg., Chicago.
Pierce, W. G., Anderson Electric Car Co., 2416 S. Michigan Av., Chicago.
Price, F. E., Anderson Electric Car Co., Detroit, Mich.
Pratt, George D., General Motors Truck Co., 2241 S. Wabash Av., Chicago.
Putt, F. A., General Electric Co., 1030 Monadnock Bldg., Chicago.
Palmer, H. G., Goodyear Tire & Rubber Co., Akron, Ohio.
Puckan, A. E., Springfield, Ill.
Pratt, E. E., 233 Broadway, New York.
Ramey, H. B., Walker Vehicle Co., 5838 Kenmore Av., Chicago.
Ray, William D., Northern Indiana Gas & Electric Co., Hammond, Ind.
Reast, Fred M., General Vehicle Co., Brooklyn, N. Y.
Ray, R. D., Goodyear Tire & Rubber Co., 177 N. Michigan Av., Chicago.
Ross, Charles S., Terminal Garage, 4464 Broadway, Chicago.
Reed, Penrose, Chicago Electric Motor Car Co., 2700 Michigan Av., Chicago.
Reed, G., Chicago Electric Motor Car Co., 2700 Michigan Av., Chicago.
Rabenatt, G. W., Storage Battery Co., Depew, N. Y.
Robinson, Harvey, New York Edison Co., 124 W. 42nd St., New York.
Reidy, E. J., Chicago Electric Motor Car Co., 1013 Davis St., Chicago.
Rich, H. G., *The Western Brewer,* Chicago.
Roper, D. W., Commonwealth Edison Co., Chicago.
Reynolds, Charles H., Reynolds-Browne Co., 1312 S. Michigan Av., Chicago.
Reed, Franklin H., *Traffic World,* Chicago.
Radley, G. R., Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Russell, Robert E., General Electric Co., Schenectady, N. Y.
Reide, C. I., General Vehicle Co., St. Louis, Mo.
Ross, E. J., Jr., Edison Storage Battery Co., Orange, N. J.
Rice, H. H., the Waverly Co., Indianapolis, Ind.
Skinner, James M., Philadelphia Storage Battery Co., Philadelphia, Pa.
Smith, Charles F., Edison Electric Illuminating Co., Boston, Mass.
Smith, Ernest F., Commonwealth Edison Co., Chicago.
Schafer, Fred B., Associate Editor Electric Vehicles, 1460 Monadnock bldg., Chicago.
Sommers, N. J., Woods Motor Vehicle Co., Chicago.
Sands, R. M., Woods Motor Vehicle Co., Chicago.
Sokat, D. Ed., K. W. Battery Co., 109 S. Market St., Chicago.
Stroup, E. P., United States Tire Co., 1222 Michigan Av., Chicago.
Simpson, D. M., Electric Storage Battery Co.
Smith, George D., General Vehicle Co.
Sperry, S., Stevens County Power & Light Co., Meyers Falls, Wash.
Sparks, F. E., Weed-Lyon Tire Grips, 1430 Michigan Blvd., Chicago.
Steel, John T., Buffalo Electric Vehicle Co., Buffalo, N. Y.
Salvat, Harry, Fashion Garage, 51st St. & Cottage Grove Av., Chicago.
Smith, G. W., General Motors Truck Co., 2241 Wabash Av., Chicago.
Scott, Albert S., Public Service Company of Northern Illinois, Chicago.
Stuber, John B., Broc Electric Vehicle Co., Cleveland, Ohio.
Strasser, J. M., Public Service Co., Joliet, Ill.
Chicago.
Shannon, James R., Vestor Accumulator Co., 2100 Indiana Av., Chicago.
Sheetz, L. H., Anderson Electric Car Co., 2416 S. Michigan Av., Chicago.
Shawan, W., Anderson Electric Car Co., 2416 S. Michigan Av., Chicago.
Smith, Charles F., Edison Electric Illuminating Co. of Boston, Mass.
Smith, C. E., Walker Vehicle Co., 531 W. 39th St., Chicago.
Skinner, H. H., Narragansett Electric Light Co., Providence, R. I.
Seaver, Charles H., Commonwealth Edison Co., Chicago.
Street, C. A., Walker Vehicle Co., 531 W. 39th St., Chicago.
Schick, E. G., Goodyear Tire & Rubber Co., Cleveland, O.
Stahl, Ernest, Jr., Public Service Electric Co.; Trenton, N. J.
Sorrick, C. H., Firestone Tire & Rubber Co., Akron, Ohio.
Smith, Frank W., the United Electric Light & Power Co., 1170 Broaway, N. Y.
Temple, Ralph, 1221 Michigan Av., Chicago.
Thompson, T. N., United States Tire Co., 1222 Michigan Av., Chicago.
Thompson, John H., Buffalo Electric Vehicle Co., 2029 Michigan Av., Chicago.
Tersy, Jesse L., Commonwealth Edison Co., Chicago.
Thiltges, F. N., Commonwealth Edison Co., Chicago.
Thompson, Stephen G., Automobile Dept., Public Service Electric Co., Newark, N. J.
Taylor, H. E., Goodyear Tire & Rubber Co., 177 N. Michigan Av., Chicago.
Thompson, Walker L., Philadelphia Storage Battery Co., 1789 Broadway, N. Y.
Titus, E. N., Philadelphia Storage Battery Co., 2612 S. Michigan Av., Chicago.
Thompson, Harrison G., Edison Storage Battery Co., Orange, N. J.
Tobias, David F., United Electric Light & Power Co., 1170 Broadway, N. Y.
Ulall, C. A., Northern Express Co., 235 S. Fifth Av., Chicago.
Ullery, Frank S., 3946 Drexel Blvd., Chicago.
Virtue, Robert J., Boston *Evening Transcript,* Chicago.
Vogt, J. H., General Electric Co., Monadnock Bldg., Chicago.
Veeder, G. R., Anderson Electric Car Co., 2416 S. Michigan Av., Chicago.
Voth, W. B., Sheboygan Railway & Electric Co., Sheboygan, Wis.
Webber, E. M., Wagner Electric Mfg. Co., 1624 Marquette Bldg., Chicago.
Wagner, E. H., Commonwealth Edison Co., Chicago.
Wardrop, Walter, *Power Wagon,* Chicago.
Wise, Herbert J. S., Colonial Club Garage, 4445 Grand Blvd.,
Wagner, Louis E., Baker Motor Vehicle Co., 2023 Michigan Av., Chicago.
Walsh, Robert, Anderson Electric Car Co., 2416 S. Michigan Av., Chicago.
Whipple, D. E., Anderson Electric Car Co., 2416 S. Michigan Av., Chicago.
Winchester Laurence S., Edison Electric Illuminating Co. of Boston, Mass.
Witherby, Edwin E., General Vehicle Co., Inc., 612 Otis Bldg., Chicago.
Whitaker, W. P., Walker Vehicle Co., 531 W. 39th St., Chicago.
Walker, George R., Walker Vehicle Co., 531 W. 39th St., Chicago.
Wagner, Harrison W., Consolidated Gas, Electric Light & Power Co., Baltimore, Md.
Welfare, H. G., National Carbon Co., Cleveland, Ohio.
Weatherby, Albert, Anderson Electric Car Co., Boston, Mass.
Weber, Albert, Commonwealth Edison Co., Chicago.
Willom, E., General Motors Truck Co., 2241 Wabash Av., Chicago.
Williams, Arthur, New York Edison Co., 55 Duane St., New York.
Wager, E. W., Walker Vehicle Co., 6828 Wabash Av., Chicago.
Westlake, E. G., Chicago *Evening Post.*
Wade, J. S., Commonwealth Edison Co., Chicago.
Walsh, F. N., Gould Storage Battery Co. of Illinois, The Rookery, Chicago.
Watson, A. D., Terminal Garage, 4464 Broadway, Chicago.
Westling, Paul A., Weston Electric Instrument Co., Chicago.
Williams, L. G., General Motors Co., 2241 S. Wabash Av., Chicago.
Wieber, C. L. F., Jr., the R. & L. C. & Co., Cleveland, Ohio.
Wieber, Charles L. F., the R. & L. C. & Co., Cleveland, Ohio.
Woodruff, Paul H., editor Electric Vehicles, Monadnock Bldg., Chicago.
Young, H. W., *Popular Electrcity and The World's Advance,* Chicago.

The Borland Electric factory on East Huron street, Chicago, has been busy recently in getting several Borland limousines ready for delivery, and this innovation of the electric vehicle industry is predicted to become a big factor in the electric vehicle manufacturing world in the near future.

Noon Hour at the Plant of the Electric Storage Battery Company, Philadelphia.

"Beardsley" Electric New Make

Initial tests of the new Beardsley electric automobile, which have been in progress for the past week, have proved the Los Angeles made machine to have remarkable possibilities. On three different occasions the new machine has shown a mileage past the 100 mark before the batteries were exhausted, and repeated tests on Grand avenue hill in Los Angeles determined its hill-climbing power beyond question.

One of the many distinctive features of the new car is the adoption of wire wheels, which lend pleasing appearance to the car, as well as giving the added advantages of increased resilience and easy riding. A fifth wheel, carrying an inflated tire, will be carried in the rear of the car.

The 10-inch wheel base, together with the specially designed spring suspension, both contribute to the easy riding qualities that the car has exhibited on its recent tests.

Only high grade materials, both in mechanical construction and finish, will be employed in the new car. One great advantage the local buyers will find is the possibility of having the car finished according to their personal tastes.

Volney S. Beardsley, well known in local automobile circles, is president of the Beardsley Electric Company, which succeeds the California Automobile Company, and John T. Shannon is the electrical engineer. The directorate of the company includes a strong representation of prominent Los Angeles business men.

A factory site has been selected at the corner of San Fernando and Wilhardt streets, and material for the new electric is already arriving in carload lots, and it is predicted that the first deliveries on the new electric will be made within sixty days.

To Open Garage in Pasadena

With the incorporation of the Los Robles Electric Garage company, a new and complete electric garage business is to be established in Pasadena, Cal., exclusively for this type of vehicles. The plant, which is located at Los Robles and El Dorado, fronting on Los Robles, will open November 1, and will be one of the most complete and largest on the Pacific Coast. Charles T. Webster, William N. Stevenson, and Allen Murphy, are the three incorporators of the firm. Mr. Webster has been manager of the California Electric Garage for several years, while Mr. Stevenson is an experienced battery man, and managed the Los Angeles branch of the California Electric Garage for a number of years. A feature of the new garage will be a charging station which is one of the finest in the state. The building cost $15,000, and with the equipment, represents an investment of $22,000. There will be day and night service, and the garage will be exclusively for electrics.

Electric Vehicles Very Economical

There is no longer any doubt as to the economy of electricity driven vehicles, both in commercial and social uses. On the farm, for example, there are now 22,667,941 horses and 4,357,430 mules in service in this country. The bulk of these are in rural and outlying districts. When the work now performed by horses and mules is done by electricity there will be many more millions of bushels of corn, oats and other grains left to feed human beings. This change will undoubtedly result in the cheapening of food for the city consumer.

Milwaukee Good Electric Town

The fact that there are 250 electric pleasure cars in service in Milwaukee means that the physical conditions are all that could be desired, even for an electric truck, says Ralph Penn, of the Ralph Temple Automobile Company, which handles the Baker electrics there. The city has 576 miles of streets, nearly three-quarters of this distance being paved with asphalt or brick, and the surface is generally rolling, with average grades of from 1 to 3 per cent, and a maximum grade of 8 per cent. The large number of Baker electrics in Milwaukee attests the popularity of this old and well known line.

Electric Car Salon at Boston

President Day Baker, of the Electric Motor Car Club of Boston, at a meeting of that society held November 3, announced that the first electric passenger car salon to be held on a large scale in this country, will be opened November 17, at the Copley-Plaza Hotel, Boston, under the auspices of the club and with the co-operation of the Boston Edison Company. The latest models of pleasure cars will be displayed in the ball room in view of promoting a personal appeal to the society man and woman. In order to restrict the attendance, the general admission charge will be one dollar. Herbert W. Moses will be the supervisor of committee work, and the chairmen of the various committees are: Exhibition, W. H. Francis; publicity, L. D. Gibbs; printing, Albert Weatherby; reception, C. J. Hatch; finance, J. S. Codman; signs, L. R. Wallis; music, J. S. Codman; police and parking, C. F. Smith, and invitations, O. G. Draper. In addition to the exhibits within doors, effort is being made to secure special parking facilities for electric automobiles in the Copley Square district during the salon, which will close on November 19.

"Although the warning of so many more days to do your Christmas shopping has not yet begun to accuse us from the pages of the newspapers and elsewhere," observes Ralph Temple, who handles the Baker electric in Chicago, "still, one of my customers on the north side has already put in his order for two electrics for delivery Christmas morning. They will figuratively be placed in the stocking of a mother and a daughter."

PERSONAL AND BUSINESS NOTES.

J. V. Harding, formerly Detroit branch manager of the Motz Tire & Rubber Company, is now special representative for that company. He will retain his headquarters in Detroit, as his duties will be principally with the manufacturers of the immediate territory. Mr. Harding is well known in the industry and this extension of territory is considered by his many friends a worthy promotion.

W. J. McDowell, who for the past three years has been with the General Vehicle Company as their electric truck salesman, and has made perhaps the best record of any electric truck salesman in Chicago, joined the force of the General Motors Truck Company, October 22, in the capacity of electric truck salesman for Chicago and vicinity.

P. E. Bertsch, formerly manager of the Detroit branch of the Motz Tire & Rubber Company, died recently in Akron, Ohio.

J. O'Gorman is manager of the new branch house that has been established by the Savage Tire Company at Portland, Ore., and J. O. Michaels is manager of the new branch at Seattle, Wash.

J. B. Magee, formerly in charge of the advertising and publicity of the United States Tire Company in the western district, has been promoted to be resident manager of the Phoenix, Ariz., branch of the company.

Claude Foster, president of the Gabriel Horn Company, whose products are handled in Chicago by the Metzger-Herrington Company, national distributors of Argo electrics, was in Chicago last week visiting at the Metzger-Herrington salesrooms at 2412 Michigan avenue.

The appointment of F. H. Hoover, formerly of the Whitten-Gilmore Company, as district manager of eastern territory for Woods Electrics, is announced. Mr. Hoover will superintend the work of agents for Woods electrics in all territories east of Pittsburgh, and will make his headquarters in Philadelphia, which has been an important distributing point for Woods cars since the earliest days of the electric car.

Having returned recently from a trip abroad, J. C. Henderson, for several years eastern sales manager of the Woods Electric Vehicle Company, has joined the selling staff of the Potomac Motor Car Company, and will devote his attention to the sale of Woods electrics.

R. V. Board, Boston, Mass., was elected president of the Kentucky Wagon Manufacturing Company, succeeding W. C. Nones.

Walpole Tire & Rubber Company has given up its sales rooms on Boylston street, Boston, Mass., and quarters have been secured at No. 1 State street, Cambridge, Mass.

The United States Tire Company has moved its central district from Chicago to New York City. Hereafter the general offices of the company will be in the U. S. Rubber building, Broadway and 58th street.

Morgan Tire Company, Detroit, Mich., is planning to erect an addition to afford 40,000 square feet of floor space.

The Southern Tire & Rubber Company, Augusta, Ga., will establish an automobile tire factory of brick construction. The factory will cover an area 50x200 feet and will have a daily capacity of 100 tires.

The McGraw Tire Company, East Palestine, Ohio, has recently increased its capital $50,000 and will increase the capacity of the work 65 per cent.

Home E. Niesz, for several years manager of the Cosmopolitan Electric Company of Chicago and present chairman of the Chicago Section, E. V. A., has been made secretary of the budget and expense committee of the Commonwealth Edison Company, following the absorption of the Cosmopolitan company by the Commonwealth company. This committee, of which Vice-President L. A. Ferguson is chairman, has an important function in the administration of the great Chicago electric service organization. For a number of years Mr. Niesz was connected with the Chicago Edison Company, predecessor of the Commonwealth company, so that he is returning to his old home and associates. Mr. Niesz is widely known among electrical men. He is chairman of the Chicago Section of the Electric Vehicle Association and Jovian statesman for Chicago.

The Woods Mortor Vehicle Company, Chicago, has opened a factory branch in Peoria, Ill., in charge of W. E. Johnston as manager.

The Philadelphia Storage Battery Company has moved its office and depot in Chicago to the Moon building, 2612 and 2614 South Michigan avenue. D. C. Arlington is in charge.

The National Tire & Rubber Company, East Palestine, Ohio, has had plans and specifications completed for a new factory building. The new structure will be two stories high, of reinforced concrete, 44 by 252 feet, and will include the main building and power plant.

The Pharis Tire & Rubber Company, Columbus, Ohio, is adding two buildings to its plant, one 73 by 100 feet and the other 22 by 40.

E. F. Thompson was recently promoted from department manager of the Motz Tire & Rubber Company to the position of sales manager. Mr. Thompson predicts bright prospects for the coming year and is positive the sales will far surpass those of 1913.

On the completion of the addition to the old electric garage building on East Maine street, Ft. Wayne, Ind., the Brosius and Hocker Garage Company will move into the building and the electric garage will move into the new headquarters at the corner of Broadway and Washington street, Ft. Wayne, Ind.

J. S. M. Eley, branch sales manager for the Rauch & Lang Electric Auto company, at Indianapolis, Ind., announces the removal of the salesroom and service station from 531 North Capitol avenue to the North Side garage, 3011 Central avenue.

W. F. Meyer, who has been connected with the Motz Tire and Rubber Company at Akron, Ohio, was recently appointed manager of the Washington branch.

The Goodyear Tire & Rubber Company, Akron, Ohio, through President Sieberling, denies reports of any intention of merging its interests with those of the United States Tire Company.

The Firestone Tire & Rubber Company, Akron, Ohio, has established a separate sales and shipping department to take care of its increasing foreign business, with C. O. Brandes in charge as manager.

The Firestone Tire & Rubber Company branch managers and salesmen's convention was held in Akron, Ohio, October 7-10. Representatives of the company from all over the country attended the conference.

E. S. Kelly, formerly tire expert with the B. F. Goodrich Company at Chicago, is now with the Firestone Tire & Rubber Company at Akron, Ohio.

Operations have been started by the Tiffany Electric Company, purchasers of the Flanders manufacturing plant at Pontiac, Mich., and orders are on hand for over 100 cars. Shipments will be started in thirty days, according to E. Le Roy Pelletier.

William B. Moseley, formerly with the Goodyear Tire Company, is now in the employ of R. M. Owen & Co., as traveling representative in the eastern district.

B. F. Goodrich Company has begun an energetic campaign for tire dealers. A large and elaborate circular, 42½ by 31 inches in size, has been printed, and is being distributed broadcast throughout the country.

R. J. Brine, of the Columbia Top & Tire Company, Boston, Mass., has taken the agency for Motz tires in that city.

The capital stock of the Swinehart Tire & Rubber Company has been increased from $800,000 to $1,000,000 by the issue of the difference in preferred stock.

The Bock Bearing Company, Toledo, Ohio, is contemplating the erection of a new factory at West Toledo for the manufacture of roller bearings. Deliveries will be made about the first of next year.

L. R. Acton has been made manager of the Tiffany Electric Car Company, of Pontiac, Mich. It is reported that the Tiffany product is well under way, and that deliveries will be made in a few days.

A number of recent changes have been made in the various plants of the General Motors Company. The Reliance factory has been removed to Pontiac, and the company has decided to give up the Owosso plant. The mayor of Owosso, however, has demanded the return of $25,000 bonus furnished the General Motors for the establishment of the Owosso plant.

As the result of a meeting held at Huntsville, Ark., on August 4, a road has been designed for trucks, which will be under construction between Huntsville and Springdale, Ark.

Walter Shonban, formerly with the Packard Automobile Company, who has been with that company for the last six years, has joined the retail selling force of the Anderson Electric Company, distributer of the Detroit electric.

Walter G. Pierce, of Chicago, recently located at Peoria, has the joined the Chicago retail selling force of the Anderson company.

Carl Fisher, manufacturer of the Presto Lighting System, of Indianapolis, has signed up a contract with the Anderson company, distributer of the "Detroit," to open an agency at Indianapolis.

William Little, sales manager for the Borland-Grannis Company, Chicago, recently returned from a business trip to New York.

The Anderson Electric Company of Detroit has reported over two hundred and fifty 1914 model cars sold on orders at factory at the present time.

The Drummond Auto Company, Omaha, Neb., agent for the Locomobile and Woods electric pleasure cars and Chase and G. M. C. trucks, has changed hands, the new officials being: President, J. W. Griffith; vice-president and general manager, F. W. Bacon; secretary and treasurer, W. L. Griffith.

John L. Hammond, formerly with the Eagle Oil & Supply Company, Boston, Mass., has been appointed manager of the new Boston branch of the Endurance Tire & Rubber Company, New York City.

The General Motors Company, Detroit, Mich., is expected to issue a statement in the near future showing that its earnings for the last year were more than enough to yield 20 per cent on the common stock, as against 17.44 per cent in 1912.

Chester Rubber Tire & Tube Company, East Liverpool, O.; $250,000; president, John E. Newell; vice-president, George A. Hasson; James C. Freshwater, George Arner.

The Southern Tire & Rubber Company, Augusta, Ga., has elected the following officers: President, Weems A. Smith; vice-president, H. S. Dunbar; secretary-treasurer, James P. Armstrong. It is announced that the company will locate a factory in that city in the very near future.

The Firestone Tire & Rubber Company, Akron, O., maker of Firestone tires and rims, had gross earnings of $15,000,000 during the fiscal year recently ended, as compared with $11,500,000 for the preceding year. Net profits were $1,600,000, and the surplus, $1,250,000. The balance sheet shows current assets of about $7,000,000.

Al Lusby has just opened the latest agency to appear on the Los Angeles automobile row. Mr. Lusby has secured the three-story building at the corner of Twelfth and Olive streets. The handsome Borland electrics gives Lusby a very strong offering and he expects a prosperous season.

The Metzger-Herrington Company is much gratified with sales in Chicago and reports that the demand on the new Argo company has compelled it to erect a large addition to its plant at Saginaw, Mich. This will increase the facilities of present factories by the addition of a large body factory and a new building 150 feet long and three stories high, for the assembly department.

The Philadelphia Storage Battery issues a pamphlet, a very dainty and unique booklet of twelve pages, stitched with a silk cord, and with the title "The Battery and your Electric Car," embossed on a two-colored cover, in purple and gray, which contains general knowledge relative to the construction of the storage battery. The pamphlet has been sent to users of the Philadelphia battery, and much can be claimed for its special attractiveness and general usefulness.

J. H. Killius, special representative of the Rauch & Lang Carriage Company of Cleveland, makers of Rauch & Lang electrics, is at the Zell Motor Car Company, Baltimore Rauch & Lang agents. Mr. Killius will remain in Baltimore several weeks.

WANTED—A young man to represent an electric automobile manufacturer on the road. Must have attractive personality and furnish reference. Only high class men need apply. Address B-25, Electric Vehicles.

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Superior to Any Gasolene Car
In Convenience of Operation, Durability, Reliability and Comfort

Superior to Any Other Electric Car
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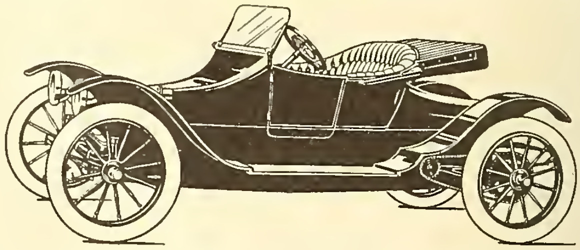

Bailey Electric Roadster
WITH EDISON'S WONDERFUL BATTERY

AT LAST
An Electric Which Can Keep Up with the Gas Cars,
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No gears to shift
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No engine, carburetor, or ignition troubles
Always starts
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Free from vibration and smell

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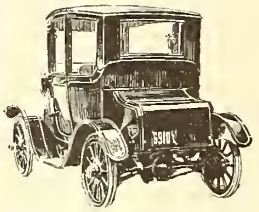

Rear view showing the graceful lines of the 5-passenger coupe

5-passenger coupe body; either front or rear seat drive; six speeds forward and three reverse. Regular equipment includes: "Exide" batteries; standard makes of cushion or special pneumatic electric tires; non-skid chains; Hull silk umbrella, etc. Price, ready for service, $2,900.

COMFORT—cozy, easy-riding comfort—protected from chill winter winds. Abundant room for five persons with plenty of knee space for all. An exclusively Borland Electric arrangement of the foot-brake levers leaves no draughty floor opening. Safe for the most timid woman to drive—power always under instant control.

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The Borland-Grannis Co. 310 East Huron Street
CHICAGO, ILLINOIS

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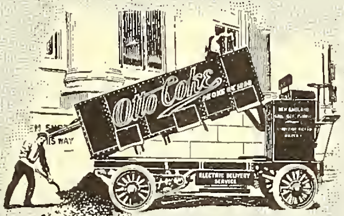
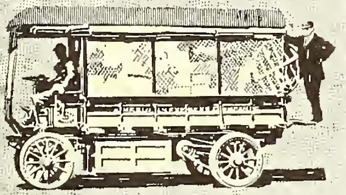
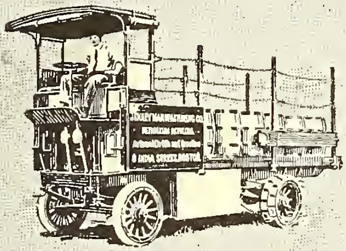
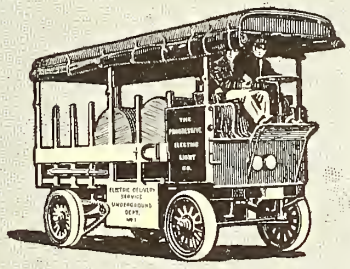
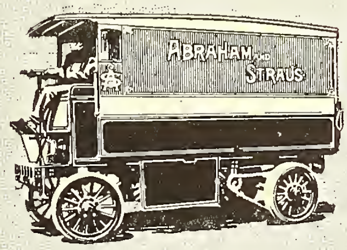
for every service

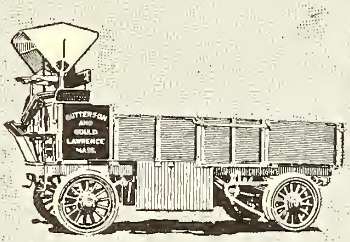


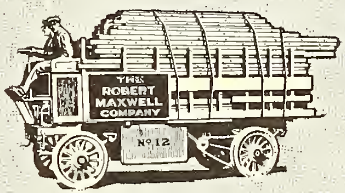


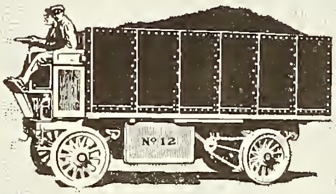


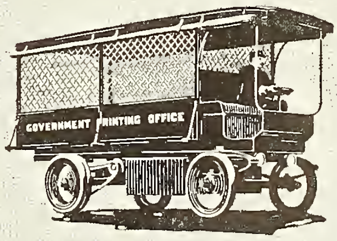












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From an engineering standpoint, it is conceded that the Electric is setting the pace in simplicity of design and construction — *economy*. Electric Trucks are cutting costs where hills are unknown as well as in such hilly centres as Pittsburg, Cincinnati, Kansas City and San Francisco—*efficiency*.

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"The Story of the
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Electric Vehicle Association of America

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F & S
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SOLE IMPORTERS
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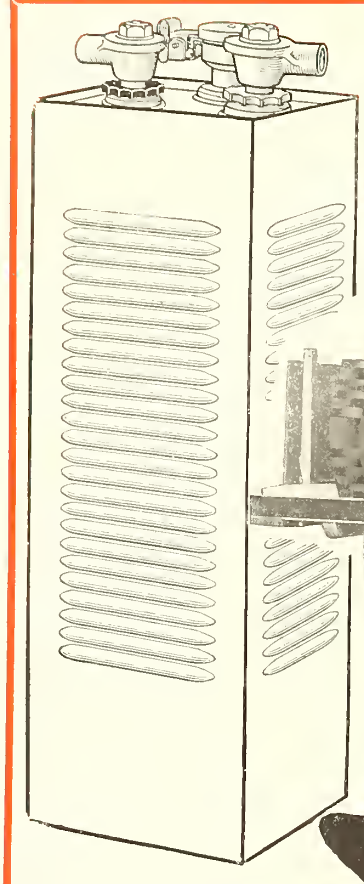
ELECTRIC VEHICLES

Vol. 3 CHICAGO, DECEMBER, 1913 No. 12

OHIO ELECTRIC MOTOR CAR COMPANY'S BROUGHAM MODEL



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Try our Malt Wine
A Nutritive Tonic
Brewed on Honor
Established 1870
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Edison-Guaranteed for four years

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Volume III CHICAGO, DECEMBER, 1913 Number 12

The Truck in the Far West

Unusual Electric Performances Under Unfavorable Topographical Conditions

BY E. M. CUTTING

IN the far West, the electric commercial vehicle has entered a field, the natural topography of which has long been effective in retarding its development. The hilly condition of the country in residential districts, as well as in the outlying territories, has been an obstacle to obtaining a maximum of speed and mileage at a minimum of battery charging expenditure. Manufacturers have not, until recently, given sufficient thought to proper battery equipment and a most efficient sprocket or gear ratio necessary to avōid overloading of the motor when operating under conditions demanding the most efficiency of the vehicle in districts where grades predominate. Merchants and business men burdened with the transportation and delivery problem are aware of the ability of this type of vehicle, yet the nature of the country over which the vehicle must work presents to their minds a serious doubt and causes them to continue with their present equipment, waiting for a demonstration and test at the expense of some other firm under conditions similar to their own.

An Oiled Road in Excellent Conditon.

Portland, Oregon, has a great many hills, with the exception of the immediate business section, which in places is slightly rolling. However, the electric truck is a familiar sight on the streets of this city, and reports from the users are favorable as to the results obtained. The department store of Meier & Frank has a fleet of nine trucks. The vehicles are successfully handling the great number of deliveries at a much lower expenditure than that of the previous horse-drawn method.

Los Angeles has few hills, and is therefore a particularly good field. The streets are improved and of constant grade, and as a result of these natural conditions, it is estimated that the city and its environs have at the present time from 450 to 500 passenger and commercial vehicles in daily use. The Southern California Edison Company of Los Angeles, has twenty electric vehicles, all equipped with Edison storage batteries. It is the contention of this company that its fleet of vehicles forms a most important factor in the economy and saving of time in its service work. By the demonstration of these trucks in continual use, prospective purchasers have had an opportunity to appreciate the true merits

A Plowed Road on a Grade of Fourteen Percent.

A Sudden Bend at the Foot of a Steep Grade.

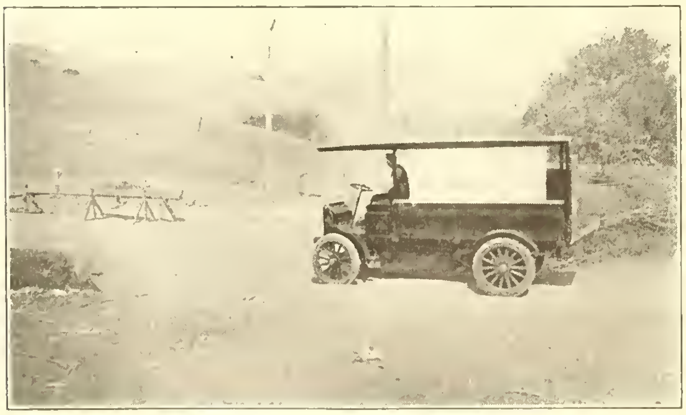
of the working capacity available in this type.

The situation in San Francisco is somewhat unsatisfactory, because of the steep grades which are continuous throughout the city. In a great many instances, installations have proven unsuccessful. In fact, the self-propelled vehicle has undergone a special reconstruction; and at the present time there are installations which, constructed by western experts acquainted with the local conditions, are operating on an economical basis.

Construction Work Caused Considerable Delay.

California holds its annual State Fair every September, in Sacramento, where are displayed the various products from all parts of the state. At the last event of this kind, the Edison Storage Battery Supply Company, and the Holt Motor Company, a manufacturer of electric trucks, made an exhibit. At the close of the fair, the truck was loaded with the Edison exhibit and a tour of 131 miles to San Francisco was promoted. The vehicle, a one-ton truck, equipped with 65 cells of Edison storage battery, was designed and built by W. E. Dorman. The entire load of the exhibit and two passengers registered a total weight of 1,760 pounds.

The first section of the run was made from Sacramento to Stockton on one charge, with considerable current to spare. The road through this section was in perfect condition, practically level, and a greater part of it oiled. At Stockton, which is also level, the main part of the city is paved, and it is exceedingly encouraging for electric vehicle service. After a tour of the city district, arrangements were negotiated for charging, but on account of the truck being equipped with 65 cells, much inconvenience and difficulty were encountered in securing charging facilities.



A Section of the Road Under Construction.

At four p. m. the next afternoon, the trip was resumed. The road to Livermore, a distance of 52 miles, was in fairly good condition. However, the last stage of the run was made over long, heavy grades and rough roads. Arriving in Livermore at 9 o'clock that evening, the only available charging plant consisted of a mercury arc rectifier, 30 amperes and 85 volts, and in order to get any charge at all, it was necessary to remove the entire load, and set the battery into multiple series of 32 cells each, leaving out the sixty-fifth cell entirely. With this arrangement, a charge of one-third the normal rate delayed the run until the next day, when the trip was again resumed on a final run into San Francisco.

This particular section furnished considerable anxiety, on account of the condition of the roads. In several instances construction work on the road caused serious difficulties. In one particular section the road was plowed up and the scrapers working. In this instance the truck encountered a fourteen per cent grade. The narrow roadway and the rough service made the severest test of the trip. This is said to be the first time this run was ever accomplished by an electric truck. It not only serves to demonstrate the working capacity of the electric commercial vehicle, but should impress upon the users of vehicles the true value of this type to negotiate conditions which are commonly thought of as outside the working scope of electric battery propelled commercial trucks.

Ohio Electric Has Popular Approval

"The Ohio electric coupe has met with popular approval," says Clarence Smith, agent at Los Angeles, Cal. "Year by year the demand for the luxurious comfort only to be had in electric coupes, has grown. This year the innovations offered in the Ohio, particularly, has made it extremely popular.

"Among the new features offered in this line is the double drive, which permits driving and full control from either the single seat in front or from the rear seat, at the convenience or wish of the driver. Then the front seats are pivoted in such a manner that they may be turned in any direction.

"The window lights are of the sashless variety instead of the framed variety, adding to the beauty of the car, and also giving a clearer, larger field of vision. This glass is mounted in felt-lined grooves, eliminating all possibilities of looseness.

"The bodies are well finished and designed. The material used in making these bodies is aluminum. The upholstery is of the hand buffed, deep variety that bespeaks elegance and comfort. In addition to the long list of equipment features these cars are equipped with electric heaters. For theater or other evening use this device is of particular value."

E. V. A. Holds Session

The regular monthly meeting of the Electric Vehicle Association of America was held Tuesday evening, Nov. 25, in the Engineering Societies Building, New York City. "The Industrial Truck as a Factor in the Efficient Handling of Internal Freight," was the title of a paper presented by W. W. White, of the General Vehicle Company.

Lessons of the Recent Convention

Address Before the New England Section E. V. A. and the Boston Electric Motor Car Club

BY PRESIDENT F. W. SMITH

WITH the invitation to meet with your society came a request that the subject on which I should talk to you be indicated. It seemed fitting that the recent Chicago convention should be briefly reviewed, and that there should be submitted for your consideration an outline of the work before us, and when I say "us," I include, of course, the members of the Electric Motor Car Club of Boston, for we are all enlisted for the same cause. Those of you who had the good fortune to be in attendance at the convention will, I feel sure, endorse the statement that it was successful from every point of view, and to the Chicago Section belongs a large part of the credit for that success. The local committees of that Section handled the matter almost entirely, both financially and otherwise. The entire membership of the Association must be appreciative of the splendid hospitality and many courtesies extended by the local central station company, the Commonwealth Edison Company, during our two-days' sojourn in its city.

Edna Hibbard, Leading Lady in "Stop Thief," and Her New Detroit Electric.

There were more than 350 delegates in attendance, the country being widely represented. More than forty new members were added, and since that time, as a result of some preliminary work by the speaker, a number of additional applications have been received, including an important central station not previously in membership, with four associate members, several press members, etc., which brings the total membership—up to the time I left New York—to 493, divided between the different classes as follows:

Active:		
Central station	65	
Manufacturers	34	
	—	99
Auxiliary		8
Press		18
Associates		368
		493

An increase since the third annual convention, held here in Boston, of 56 per cent.

It would be exceedingly gratifying if your president could take back to New York with him ten applications for new memberships, in order that our roll may show above the 500 mark. Some few resignations, principally associate members, have been received, who have, for the most part, severed their connection with the electric vehicle industry. It is believed, however, that we shall be able to keep these resignations well within ten in number.

There was a considerable amount of pre-convention publicity secured, both in the New York and Chicago daily newspapers, and I believe some publicity here in Boston. There were more than twenty-five technical and trade journals which gave the convention advance notice, many containing lengthy articles, and the convention proceedings have since been widely published by the technical press. All of this publicity is of importance and helpful to the Association and to the electric vehicle industry generally.

Formal application, as required by the by-laws of the Association, was presented at Chicago by fifteen Philadelphia delegates, asking permission for the formation of a section in that city. Your president has since been in correspondence with the executive of the Philadelphia Electric Company and has had assurance of its active co-operation in the formation of this section, and the matter will be formally acted upon by our board of directors.

The business sessions took up the entire time of the two days, October 27 and 28, meetings being held from 10:00 a. m. until after 5:00 p. m., with intermission only for luncheon, the evenings being left open for entertainment, with arrangements providing for an inspection trip to the South Side garages by electric automobiles, which was largely attended by the delegates.

The program, with the presentation of ten papers, together with the reports of the several committees and chairman of the two sections, was varied and the papers were well received and the discussion snappy, interesting and instructive. The proceedings as set forth in the stenographic minutes, not including the papers themselves, cover 250 closely typewritten papers. A reprint of these proceedings, bound and indexed, will be published for general circulation. Three thousand copies have been ordered, and this will make it possible to generously distribute the full proceedings to the members and to those interested. The speaker commends for your consideration these papers for review in the coming meetings of your New England Section. It is intended to follow this plan at the December meeting in New York. A paper for the November meeting has already been arranged for and is entitled "The Industrial Truck as a Factor in the Efficient Handling of Internal Freight."

Your president has carefully analyzed the proceedings of the convention, and all suggestions that were made on the floor, either in the form of a motion or otherwise have been tabulated and it will be the early concern of the administration to carry on the work by committees or otherwise along suggested lines as far as possible. Something has already been done in this direction. The formation of these committees and the appointment of chairmen, therefore, is one of paramount importance, for with the increase in membership which will follow an active campaign and the expansion of the electric vehicle business, the experience of important societies, such as the National Electric Light Association, will probably be repeated in the case of our Association. That is the necessity for team work of committees. A quotation from the September bulletin of the N. E. L. A. will serve to emphasize this point:

> With the development of committee work of the Association have gone the perception and acceptance of the principle that while leadership is ever desirable, what the industry really needs is not simply the expression of individual opinion, but data collected over the whole area and the ripest judgment in its interpretation. Hence, in the affairs of this body, the committee looms up more and more in authority and the committee report more and more embodies and enforces the practices that have the largest adoption.

Many of the chairmen of committees have already been selected and for the most part those gentlemen have accepted, and the personnel of the complete committees is a matter that will be taken up in detail at the directors' meeting this month.

The matter of increasing the membership and the formation of branch sections throughout the country is of foremost importance, and you will be interested to learn that Mr. Joseph F. Becker, of the United Electric Light and Power Company, New York, has been good enough to undertake this work as chairman of the committee on membership and formation of sections. Mr. Becker's work as chairman of the membership committee of the commercial section of the N. E. L. A. and his activities as New York statesman of the Jovian order has given him especial fitness for this work and he has been added to the list of boosters for the electric vehicle.

Much preliminary correspondence has already been carried on by this committee, and at an early date an active and aggressive campaign throughout the entire country will be launched which by the close of the year will, we hope, show gratifying results. "Double the membership in twelve months," will be the slogan of the committee in charge of this work.

In going over the proceedings of the convention the speaker was impressed with the fact that the one dominating note throughout the convention still seemed to be one of criticism against the central station and its attitude toward the electric vehicle, although this criticism was more constructive than heretofore, and it seemed to be the consensus of opinion brought out in the discussion that there had been a marked and noticeable improvement in this respect during the past year. I have been greatly impressed and convinced with the fact that something should be done through the coming year to increase the interest on the part of central stations and, more than anything else, to determine exactly what the status is as to the central stations' attitude throughout the country; that is, what central stations are co-operating; to what extent are they co-operating and how; and the reverse of the picture; what central stations do not co-operate, why do they fail in this respect, and what can be done to decrease the names under this heading and place them in the column of co-operators.

Your president has reached the opinion that the formation of a committee on central station co-operation could accomplish more to bring the central stations and the manufacturing interests together than any other method that might be employed. Such a committee could present at the next convention a year hence a report that would answer once and for all the question as to the extent of this co-operation, and how the conditions had been improved, or otherwise, throughout the year. It is so obvious that there is a community of interest as between the central station companies and the manufacturers of electric vehicles and accessories that certainly it should not be difficult, with the right kind of co-operation, to bring these two interests into perfect harmony throughout the country.

The Association has indeed been fortunate in securing the services of Mr. Harvey Robinson to act again as secretary, and great credit is due Mr. Robinson for the work that he has done in the past, and Mr. Robinson will continue his efforts on behalf of the society. It is apparent, however, that very early consideration must be given to the problem of securing the services of a paid secretary, whose entire time shall be devoted to the work, and in this connection it is pointed out that the society must soon be provided with permanent and independent headquarters. In the speaker's judgment, we have now reached a point where the society is on firm ground and where it must be developed along broad and comprehensive lines, and the facilities and machinery must be adequate for this work.

The present income from dues is just about sufficient, with care and economy on the part of those responsible for the affairs of the Association, to take care of the present operating costs, including the expense of the annual conventions (bearing in mind, of course, that through the generosity of the central station companies in those cities where the annual conventions have heretofore been held a large part of the expenses of such conventions has been borne by these central stations), so that the question of proper financial arrangements to broaden the scope of our work is a matter that must have early and careful study.

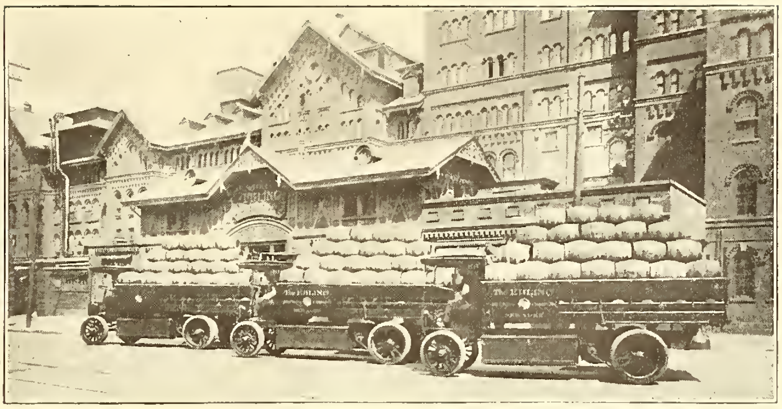
There are several new branches of work that should be taken up which will involve the formation of commitees, such as traffic committee and good roads committee, each of these committees to work in conjunction with other organizations interested in the same degree as our own; and a committee to co-operate with the commercial section of the N. E. L. A., in connection with the preparation of electric vehicle data for publication in the Salesman's Handbook, and other work of importance which should be undertaken by this Association.

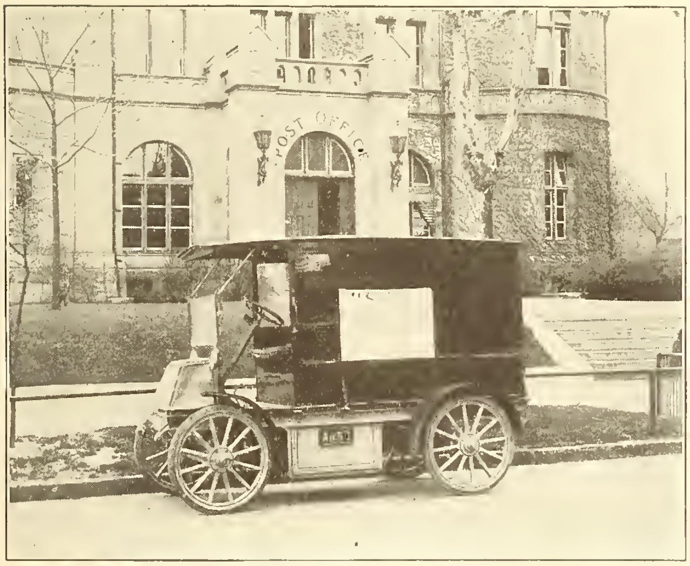
It will interest you to know that I was called upon by the Electro Coach Corporation to appear before the mayor of the City of New York and the Board of Estimate and Apportionment in connection with a public hearing being had on the petition of this company for a franchise to operate buses propelled by electricity, and I had the honor of speaking briefly on behalf of our Association in favor of the electrically propelled bus, giving some facts and figures with regard to our Association and the growth of the electric vehicle. If the Association can be helpful in matters of this kind, a great work can be done.

In the report submitted at the convention by the advertising committee the plan of increasing the circulation of the booklets published by the committee was outlined. Since that time rather gratifying response has been received to the circular letters and there is an indication that the central station companies and accessory manufacturers may find it possible to use these booklets for distribution in connection with their other publicity matter. A sample copy of the books has been sent to all subscribers to the campaign fund. On behalf of the publicity committee I bespeak your consideration of the use of these booklets. As set forth in the report submitted by the committee, the first 5,000 copies will cost in the neighborhood of 25 cents each. If this issue can be increased to 10,000 the average price will be reduced to about 15 cents for the pleasure vehicle booklets and 17 cents for the commercial vehicle booklets.

In conclusion let me repeat what I said in Chicago, that the real work devolves not upon the directors or presiding officers of an association like ours, but upon the members individually and collectively; in other words, in team work. When we consider that with a present membership in round figures of 500, of which there are but 65 central station companies, less than ten manufacturers of auxiliary apparatus, and practically no electric vehicle users, and when we balance against these figures the number of firms, individuals and central station companies on whom we have to draw for membership, the possibilities of making this organization one of the largest and most influential in the electrical industry is not an idle dream.

The speaker is not in accord with the theory of building the organization on a foundation of mere size and number of members, but rather from the standpoint of service and utility. We must have members to produce the necessary funds to carry on the work; on the other hand we must produce beneficial results and be a real factor in the electric vehicle situation if we are to stand on a firm foundation, for if we accomplish results for the benefit of the industry the membership curve will take care of itself.


Atlantic Five-Ton Trucks Used in the Service of Ebling Brewery Company.


Argo Electric in Parcel Post Service.

I therefore ask the members of the New England section and of the Electric Motor Car Club of Boston and of the electrical interests generally throughout New England to put the same energy behind their efforts on behalf of the electric vehicle that they are well known to exercise in any other direction of electrical development.

Ohio Models Artistic in Design

The model "M" Ohio electric, the latest model of the Ohio electric line, has arrived in Oakland, Cal., and is now on display at the new salesrooms of the A. B. Cosby Motor Company in Telegraph avenue.

The car is a five-passenger of the brougham type, with double drive from both front and rear seat. It is of an exceptionally artistic design and the electric vehicle enthusiasts of Alameda county are quite loud in their praise of the new machine.

A. B. Cosby, head of the company handling the Ohio electrics, has appointed R. S. Pribyl to the position of sales-manager for Alameda county. Mr. Pribyl is well known in the electric vehicle field and has been associated with the Ohio agencies in Chicago and other large eastern cities. He was attracted to the Oakland house by the unequalled opportunities of the field from an electric standpoint, Alamedo county being one of the best electric vehicle territories in the West.

Mr. Pribyl stated that he expected to place many of the classy Ohio electrics in Oakland. He says:

"The design of the model M has met with general approval. The exterior finish is exquisite, due to painstaking labor such as was common with the family carriages of our grandparents, but is uncommon today. The interior appointments are such as to lend an added charm to the most dainty woman or delicate costume. Built on the straight-line order, it is a very roomy car with the popular rounded limousine rear. Its seating arrangement is for five passengers—having two revolving forward seats."

Electrics Show Increase

Chicago has long had more electric passenger vehicles than any other city, the number at the present time probably being close to 3,000 for the city and suburbs.

Figures for the city since November, 1910, show that the number of electric commercial vehicles employed is increasing at a tremendous rate, as follows:

November, 1910, 80 electric commercial trucks; November, 1911, 150 electric commercial trucks; November, 1912, 365 electric commercial trucks; May, 1913, 647 electric commercial trucks; August, 1913, 690 electric commercial trucks in service and on order.

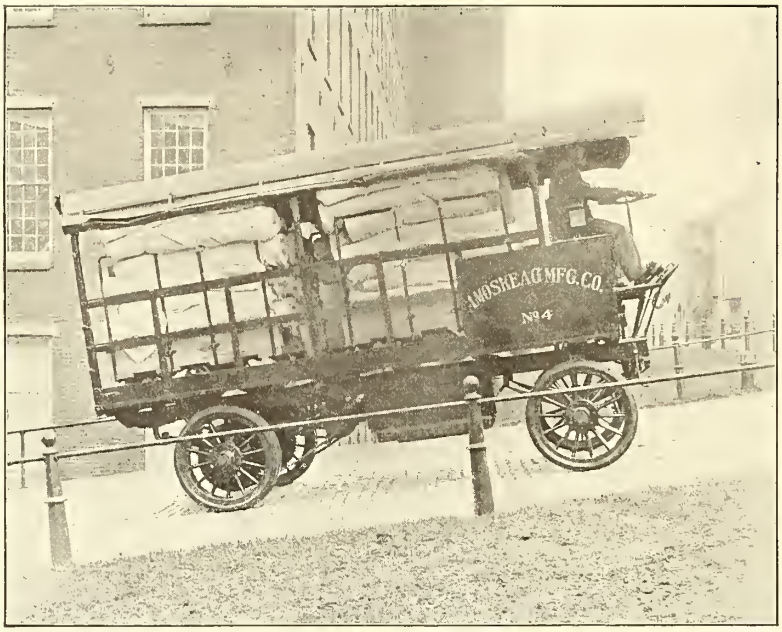
The Merchant, the Central Station and the Truck

Paper Read at the Annual Convention of the Electric Vehicle Association

BY F. NELSON CARLE

IT is obvious, I think, that the central station is coming closer and closer in touch with at least the progressive merchants and manufacturers in the territory which it serves. Central-station expansion has been made possible by virtue of public confidence quite as much as by economic law. I propose to show how the confidence which the public already has in the central station can be capitalized in building up demand for the electric truck.

The public of today buys largely what it is, through advertising, educated to buy. This is as true of necessities as of luxuries. That it is being persuaded to drink increasing quantities of real coffee and postum; of beer in brown bottles and innocuous grape juice, does not alter the principle involved. Last year the chewing-gum industry reached the respectacle volume of $34,000,000 in sales.



A G. V. Truck Negotiating a Steep Incline.

ELECTRICAL PROGRESS DUE TO EDUCATION

The steady, increasing demand for electricity for so many purposes is the result of the right kind of education. Yet, how many central stations have 60 per cent of their residences and factories on their list? Evidently there is much more advertising to do, many more architects to reach, many more business men to resolicit and convince. This after years of educational work in one locality. Can't you see, if they are to work unaided, how much greater will be the burden of our handful of electric truck manufacturers with the whole country before them?

The central station in general has a wonderful opportunity to aid in the introduction of the electric truck because of the fact that it is in no small degree a consulting engineer to industry and commerce. It is a recognized public servant, an aid to local growth and prosperity. The central station is the logical advocate of the electric truck, and this is why the truck manufacturer asks its aid in agitating, through local advertising and other publicity methods, its increased use.

This does not mean that we on the manufacturing end are trying to force central stations into our way of thinking or that we are endeavoring to make them share, without remuneration, our burden of introductory selling. It means that with their aid (aid which will be a splendid investment for themselves) we can cut down the first cost of distributing our product eventually.

The most economical distribution of merchandise is secured not by blazing new trails but by utilizing existing channels of trade. The textile manufacturer, for example, sells to the jobber, who sells to the retailer, who in turn sells the consumer. The manufacturers selling overhead is thereby reduced, since the jobber markets many different lines through his own organization. Only a few well-established manufacturers can afford to be their own jobbers. The majority of electric truck manufacturers are in no position as yet to sell direct exclusively, neither are they able, for good reasons, to utilize the army of automobile agents. If the central station cannot act as a warm-hearted missionary for the truck, the electric's cost of distribution must invariably *restrict production*. Furthermore, that distribution will continue to be in the districts of least resistance or selling cost. It is not what we would *like to do,* but what we are *able to do* on sound business principles, which determines the volume of electric truck sales.

ADVERTISING AT SMALL EXPENSE

I have said before that the central station enjoys prestige and influence in its native city. It can advocate the use of the electric trucks as no out-of-town manufacturer or local agent can possibly do. It can approach the subject from the standpoint of sanitation, relief of street or terminal congestion or lower delivery costs, and its suggestions will be received with interest and respect. But let me quote from a recent central-station advertisement, making the name fictitious and eliminating reference to make of truck:

> THE AMERICAN ELECTRIC LIGHT COMPANY ENDORSES ELECTRIC TRUCKS.
>
> We already supply electric current not only for store and residence lighting, but for industrial purposes. From supplying power to office buildings and factories to meeting the current demands of storage batteries is a logical step.
>
> But we have gone a step further. Believing that . . . merchants and manufacturers look more or less to the electric light company for advice in electrical matters, we have placed ourselves in a position to aid them in the selection and adoption of electric trucks.
>
> Our purpose is to promote the sale of electric trucks and wagons on a basis which will insure satisfaction and economy to the user. We feel certain we can aid local business men in securing more efficient deliveries at a saving to them, and at the same time make . . . a cleaner and better city to live in.

> You all know what motor trucks have done for modern business and we hope to interest you in the best city truck in the world. Ask our representative to call and give you full information. Just 'phone Park 7400.
>
> (SIGNATURE)

Anything undignified about that?

The advertisement occupied a space three columns wide by ten inches deep or "10 across 3," as the newspaper men say, and the thirty inches cost exactly $15. This in the leading paper in a city of 150,000 people. You see the central station enjoys both the local rate and the yearly quantity rate, and it advertises other current-consuming devices, anyway. Electric truck manufacturers as "foreign" advertisers would have to pay at least $25 for such space, and the advertisement signed by the manufacturer or his local sales office would create about half as much interest in the electric truck as one signed by the local business men's friend, the electric light company. Surely there can be no harm in substituting an electric truck advertisement for one on flatirons occasionally, and I believe any commercial manager can afford to spend $100 some months in quiet, dignified advertising of this type, and charge it, if he is very conscientious, to deferred dividends on future offpeak current sales. Where he has a nucleus of big trucks already on his lines, he would certainly seem warranted in trying to increase that number by such a method.

The local merchant is the "ultimate consumer" of the electric truck (I use the word merchant in a general sense) and part of every central station's good will is bound up in its pleasant relations with the merchant. This good will, then, is a splendid asset to the central station in promoting the sale and use of electrics. On the other hand, the advantage to the merchant of having the advice and guidance of the central station in the selection and installation of an electric delivery service is very great. The whole proposition is one of mutual cooperation, eventually three sided, but at first almost wholly between two local business men—the commercial manager and the merchant.

A GREAT EDUCATIONAL FACTOR

I think the greatest single educational force behind the electric truck of to-day is the Electric Vehicle Association of America. Next to it in influence and results is the splendid work of the central stations in New York, Chicago, Boston, Denver, Baltimore and other cities. We should not gauge such publicity work wholly by the increase in number of electrics sold in these cities, but keep in mind its cumulative value and the fact that its influence is being felt all over the country. The advertising of the Electric Vehicle Association of America is a national and international force, turning the thoughts of scientific men as well as business men into new channels and creating a keener interest in horseless delivery of all kinds. It is preparing the mind of the public for a gradual adoption of the electric and it is doing this broad gauge, constructively educational work, in many respects, far better than the individual manufacturer could do it, even if he had the resources.

In seeking to capitalize local confidence in itself, the central station which advertises to the merchant reinforces the work of the Electric Vehicle Association of America and the national and local advertising of the electric truck manufacturer. Thus the central station has no small part in promoting electric truck distribution all over the country. And the pleasing part of it is that by reason of its intimate relations with the merchant it can be the first to "cash in" on the cumulative work of the first two. There are exceptional cases, of course, but the results secured by the central stations which have gone at this matter in a whole souled, practical way are illuminative.

UNITING AGAINST THE HORSE

Lest you might think I have purposely kept the electrick truck manufacturer in the background, let me say that he is busy working out endless sales problems peculiar to this stage of the motor truck industry. He is obliged to keep down his selling costs and be able to earn dividends, however modest, in an effort to secure more capital with which to expand. If a generous percentage of his output has gone to express companies, breweries and department stores, this is because it has been good business for him to solicit such quantity business—not that he has a special preference for any particular line of trade. Electric truck production is restricted not by the inability to manufacture good trucks in sufficient quantities, but by the hysterical competition of our gasoline friends, the present prohibitive cost of selling in certain large territories and also by the indifference of a few of the "consulting engineers" I have referred to. These last are now beginning to realize both their opportunities and their responsibilities.

When they decide to buy or recommend gasoline trucks for work which the modern electric can in most cases do at less cost and at higher efficiency, it is not the electric truck manufacturer alone that they ignore, but their friends the local merchant and the valley in their own load curve. If the merchant (still in a general sense) is worth cultivating as a market for improved lighting systems, new elevators and industrial motors, he is worth even more as a future offpeak asset, and to remain indifferent to the electric truck, already working successfully in 42 states, is a poor way to capitalize public confidence in things electrical. On the other hand, if we all look upon our 10,000,000 city houses as 10,000,000 small isolated plants and pursue the horse with the same devotion to a principle that we do the real isolated plant, the merchant, the central station and the electric truck should and will all do business on a highly remunerative basis indefinitely.

DISCUSSION

Mr. Marsh: Mr. Carle has spoken about the active cooperation of the central station in its usual advertising columns, and if the central station did not go any further than that, the mere endorsement by the local company that has the confidence of the local merchant and the local manufacturer would be about as strong an opportunity as the central station could seize upon to help itself. The local merchant and the local manufacturer must inevitably put a great deal more confidence in a large company conducted in their own town than they can possibly have in the foreign manufacturer of electric trucks. Where we have carried that out we have found great success in Boston by the endorsement of the manufacturer of the electric truck, and why shouldn't the central station endorse the electric truck as much as the electric sign or the electric motor?

Mr. Witherby: This subject is a very tender spot—the fact that the central station will not give us full, hearty-cooperation in all cases. Excepting just a few cases, comparatively speaking, that is the real fact. Now here we are all supposed to be almost a unit in helping, boosting, pushing along more universally the use of electric vehicles, both pleasure and commercial. We haven't got very many central station men here, and the few we do have with us are all with us in what we are trying to accomplish; but the average feeling of the central station management against the electric is something phenomenal through this Middle West. For over twenty years I have been a central station man myself; I know just what it means, and I know how they look at the various commercial problems. The average central station man today will not wake up and realize that he must be one of the first to introduce it, that he must be the one to show to his fellow townsmen and merchants that it can do the work and will do the work.

I think one of the most recent examples I can point to is Cleveland. They have installed eighteen gasoline trucks. This is an example of the biggest, supposedly one of the most representative and up-to-date central stations in the country, and in the face of what it can do and should be doing with the electric vehicle it puts in eighteen gas cars. In my efforts to sell the electric car I have run up against almost every central station man of any prominence in this Middle West in the last year. They do not seem to realize the progress made by the electric; that the battery is a thousand per cent ahead of what it used to be; that engineering and general refinements have made the mechanical parts of the electric truck far away ahead of what it was; but they will still point to some old-time remembrance where an electric truck was mentioned to them as a failure by someone who didn't know what to do with the battery. When we point to various shining examples of ten, fifteen, twenty, or a hundred electric trucks doing the work and doing it every day, they question our veracity. A frequent case is of the man who is using trucks in a commercial proposition. He is making his own current, but he is using electrics because it pays. And yet the electric light man, who should be the biggest booster, is one of the hardest to convince.

Mr. Day Baker: I would like to say in connection with Mr. Carle's paper, that I have found in the New England territory that wherever we are able to secure the hearty co-operation of the central station, there the electric vehicle succeeds and multiplies rapidly. The Hartford Electric Light Company has taken hold of the electric vehicle situation. It has advertised that it believes in electric trucks and has recommended them to friends. In its garage it has furnished a place where they could be charged, and as a result we have a very large fleet of electric vehicles, of various makes, located in Hartford, Conn. Another example is at Worcester. Mr. Rawlins, who is the president of the Worcester Electric Light Company, is a hearty believer in the electric vehicle, has recommended it to all his business friends, takes space in the newspapers and advertises it every week, and his solicitors solicit power through the medium of the electric truck; and as a result the sales in Worcester are increasing. Mr. Hollowell, who is now the chairman of our New England section, has been a very faithful worker in the electric vehicle field, he has recommended electric vehicles to his business friends, has advertised them, has talked them, and has put up a garage so that they can be properly charged and cared for, and as a result the electric vehicle industry at Lowell has prospered very materially. The increase there during the last year has been over one hundred per cent, and I am certain that the electric vehicle business in Lowell during the next coming two or three years, will increase very rapidly.

This only goes to illustrate that where the central station takes an active interest, supports the electric vehicle and allows the public to know that it supports it through the medium of advertising, there the electric vehcile succeeds and there we sell vehicles. I think that every central station should take up the question of electric vehicles, for I am certain that where they do they will get returns.

Mr. Smith: It has been my privilege within the last few months to attend two conventions of the Central Station Association in two states. I would suggest that our Association pay a little more attention to the central stations through their state organizations, and that every individual member of our Association in the state where he resides back up our theory and desire to practice co-operation with the central station by attending its conventions and putting the matter before the central stations. It may not have occurred to any of you gentlemen here that the recent change in the laws of many of the states—notably the state of Indiana, which now has the same law as the state of Wisconsin for public utilities—that change in the laws has been an incentive to the central station man to get busy and join his association, so that to a certain extent those annual meetings of the state associations are going to be very much better attended and the associations are going to be backed up very much heavier and better by the central stations.

Owing to the hard work that Mr. Witherby did at the Ohio state convention, a committee was appointed by the association called the Electric Vehicle Committee. I have seen four of the members of that committee since the committee was appointed, one at Toledo, one at Youngstown, one at Dayton, and one at Columbus. As a result of that I know of one central station which has just put on an addition to its force and given the gentleman the title of commercial vehicle expert. I speak of the Toledo central station. Now, if everyone in his state will take the same pains and trouble to attend those conventions and wake them up a little as Mr. Witherby, my associate, did in Ohio, I am sure it is going to produce great results as it did in the two states where it has recently been put into effect, Ohio and Indiana.

The Chairman: I would like to say on the subject of joint advertising, or advertising on the part of the central station companies connected with the advertising of the Electric Vehicle Association, that that subject will be touched upon to some extent in the committee's report. We will make an attempt in this second year's campaign to advertise in the central station magazines, not to the central stations to use electric vehicles, but to advertise electric vehicles, to couple their advertising with the advertising of the Association. Three pieces of copy have already been approved along that line.

Mr. Lloyd: There is one short sentence in this paper that seems to me a most apt illustration. He says that we should look upon ten million city horses as ten million small, isolated plants. As one of the previous speakers said, most of the central station men in this gathering are already enthused along this line. It is the central station man who hasn't come here that we want to reach, and if that point could be made in the advertising to reach those men, it would count for a great deal. Talk to a central station man about a one-horse power or a two-horse power steam engine and he is up and after it at once. Convince them that every truck is a one-horse or a two-horse plant and I think you can get them after it.

Mr. Conant: The most important point has been brought out twice by speakers, and it is this: The heads of central station organizations who are in sympathy with this propaganda are present here and make themselves felt in this convention, but the ones that we want to reach pay no attention to it. Some of them send representatives and the representatives become enthused with the idea and go back with the idea of communicating that enthusiasm to the higher authorities, but with little success. Our effort must be to get them to come or else we must go after them in the form of committees or representatives representing this Association, so that we may carry the facts or our enthusiasm to them.

There is one city not far from here where they are using electric vehicles extensively; the central station apparently believes in them, and yet the head of that organization is only luke warm to the electric vehicle himself. Within a radius of two or three hundred miles there are many companies in large cities that have shown no interest whatever, and in some way we must reach them with the collective force of this Association.

Mr. Hewitt: I would like to say a word that I think is necessary in defense of the central station. There has been a great deal of criticism about the attitude of the central station towards the electric vehicle movement. I have yet to discover any lack of effort on the part of the central stations throughout the country to assist and co-operate in the selling of those vehicles. In the last three months I have visited some forty or fifty cities throughout the South and West in the interest of our vehicles, and in every instance I have called on the central station manager and found him in an attitude to help in every way towards sales. I am a truck manufacturer. I think it is rather hard on the central station to have to bear the brunt of our selling organizations. It is up to the manufacturer to sell his product and not up to the central station man to do it. I have yet to know of a central station that is not putting forth a strong, co-operative effort to sell electric vehicles and in that way get sales of current.

Not long ago I was in a little town of some twenty-five or thirty thousand people. The central station there owned three electric vehicles, trucks. It didn't have use for them in its own business, but it employed those vehicles as demonstrators to assist in the sale of trucks in that city. They had big brass plates on them, "Truck Demonstrator," and about four or five days out of the week those trucks were in service hauling goods for prospective purchasers in the town.

That is only one instance of a number that I could cite through the South and through the West. A great many of them have men that they are calling electric vehicle experts, such as Mr. Smith said, who are encouraging the sale of trucks by having a man actually soliciting the business and then turning it over to the truck manufacturers. I have never yet found the central station in a city large or small that hasn't done its part toward assisting in the sale.

Mr. Mansfield: I would like to say a word in defense of the manufacturers. I am a central station man. I don't agree with Mr. Hewitt. I don't think the central station men are co-operative as a majority. I think the majority of them don't care anything about the electric vehicle. At the convention of the N. E. L. A. section at Burlington, we had a paper on electric vehicles. The New England Section of the E. V. A. asked them to put the electric vehicle paper on the program which they did. As soon as that paper came up for discussion the central station men all left the room, that is, all those that weren't interested. It is the same thing here; those who are interested come, but those who aren't interested stay away. It isn't wholly the fault of either side. In a good many cities the manufacturer goes in and tries to sell electric vehicles, and he goes away and says the central station is asleep. In another instance the central station starts a campaign without saying anything to the manufacturer and says the manufacturer is asleep. If the central station in a given city or town and the manufacturers who are willing to sell in the city could get together and decide on a policy I believe something could be done instead of criticising.

Mr. Curtis: I think the most important thing to be done to bring about the results that are apparently necessary will be to get all of the central stations as members of this Association. That particular thing will be one of the greatest importance with the work for this coming year. Several speakers have said that most of the central station officials remain away from these meetings, and I have already arranged to send a personal letter to each one of the central station managers in our territory, telling him that I am forwarding him a set of the papers at this convention, and those papers will go with the letter. I am going to try to keep central station people informed consistently and repeatedly regarding the work that the Association is doing, and eventually they will want to assist in the work. That, I think, should be a very important function of the incoming administration. As a central station man I must add a word. I think it is unfortunate that at every meeting we have the central station criticised as to its attitude toward the electric vehicle. It is a great relief, however, to see that criticism is taking a different form. I think Mr. Witherby observed that there was an improvement.

Mr. Witherby: Undoubtedly there is a very large improvement, as I have found from central station men whom I have met. A great many of the central station men have been honest enough to say, "I believe we have been asleep at the switch. Now we realize just what the electric vehicle can do for us, both passenger and commercial. We are going after it and we are going after it right." I hope they do just as they say, and some of them are unquestionably consistent and honest, and will go after it, but it has taken a long, hard time to get them to realize that they must show by example. I know of one case where the manager of a manufacturing concern said, "Yes, we believe that the electric truck is about right. You have just about convinced us that we should use it. But if it is all you say it is and will do all you say it will, for heaven's sake why doesn't the electric light company use it itself?" Now, this is a hard argument, and it is these things that have made me go after it so persistently. But the change is bound to come, and I believe a year hence will show a very great change in the feeling of the average central station man towards the electric vehicle.

Predicts Great Year for Electric Autos

The Standard electric car is now represented in Minneapolis. The Barclay Auto Company has just taken over the agency for the car, which is made by the Standard Electric Car Company, of Jackson, Mich.

B. N. Teague, district manager for the Standard Company, after looking over local conditions, says: "Minneapolis is one of the best electric automobile cities in the United States. I am looking forward to Minneapolis developing one of the best markets for a popular priced car.

"The electric car today is built on such scientific standardized lines that you cannot improve on its construction to any great extent."

Mr. Teague has charge of the Standard company's business in Minnesota, Wisconsin, Illinois, Iowa, Kansans, Missouri, Colorado, North and South Dakota and Canada. On a recent trip through this territory he found automobile conditions in good shape and predicts that 1914 will be one of the greatest years the industry has had. He also feels confident that the end of the present season will find the Standard Electric Car Company one of the largest manufacturers of electrics.

Ohio Open Type Coming

D. B. Rose, the Ohio electric agent of Pasadena, Cal., has just received word from the Ohio factory that it will have ready for delivery about Christmas, a new open car of the roadster-victoria type. This new open body will be placed on the same chassis as the present coupes and should make a very attractive car.

In speaking of the new model Mr. Rose said:- "Last summer the vice president and the sales manager of the Ohio factory were in Pasadena and in looking over conditions here decided that there was a good market for cars of the open type. On their return to the factory they put the wheels in motion to turn out the finest open type body. The chief draftsman was sent to New York to get the latest ideas in bodies, and all the new things will be incorporated in the new car. The demand here is good for a car of this type.

Interior View of an Ohio Electric Brougham.

"We have calls every day for an open car with our magnetic control and we have been losing this business on account of not being able to furnish the car. The Ohio factory has a very down-to-date policy and believes in giving people what they want. I have a carload of these new cars ordered and hope to make deliveries by Christmas.

"Prospects for Ohio business in Pasadena are quite promising and I expect to make this a strong city for my car, the same as all other cities where we are represented. When I receive the open cars my line will be complete. Our double control car is proving very popular, this being our third successful year with the above model."

The Landsen Company, electric vehicle manufacturers, will move its business from Newark, N. J., to Allentown, Pa. Some of the heavier machinery has already been installed in the plant at Allentown. Much Allentown capital is invested in the Lansden Company. The company will occupy the plants formerly used by the Webb Company and the Mack Brothers Company.

Successful Electric Truck Installations

Examples of Various Industries Which Have Found the Electric Profitable

BY J. HARRY PIEPER

Lansden Electric Truck Entered in Commercial Vehicle Club Parade.

AVAILABLE information relative to the work performed by the electric vehicle gives absolute proof of its economy. If those who are really interested in an economical and reliable form of transportation would investigate the service given by electric trucks in all sections of the country, it would not be long before this type would lead all other forms of transportation. Those who are aggressive and constant advocates of the electric vehicle believe it will safely and economically handle any kind of transportation or delivery within its field. Successful performances have convinced them that such faith is justified, for it delivers the goods, economically and efficiently.

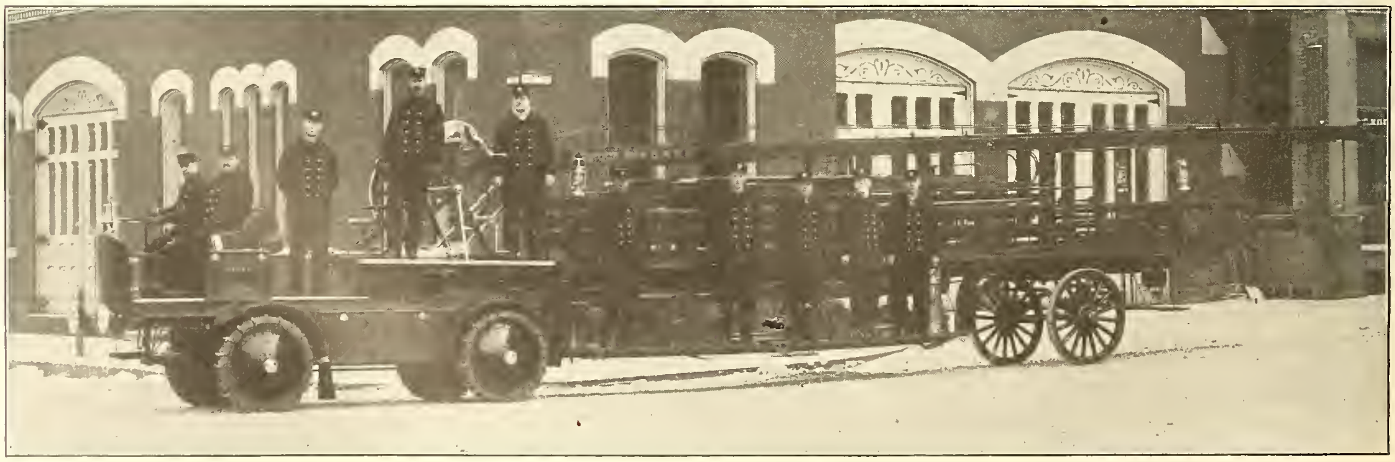
This year's sales exceed all previous records, and the indications are that in every line of trade, business men are coming to a realization of the fact that the electric truck is the real solution of the city trucking problem.

A recent interesting installation was made by Henry Disston & Sons of Philadelphia, of a two-ton electric truck with an electrically operated winch dumping body. This truck not only does more work than four horses and two wagons did before, but the company states that the services of eight men and one handcar have been dispensed with. This type of car, ranging from 3½-ton to 5-ton capacity, has been adopted by contractors in various lines all over the East, and they have worked out so satisfactorily that repeat orders have been secured.

In constructing the Ontero Irrigation System, near Denver, F. L. Lucas, chief engineer of Henry L. Doherty and Company, has ordered a specially constructed electric truck with dumping body. Mr. Lucas says: "In spite of the fact that we are usually obliged to do our hauling over pretty bad roads, I feel we can demonstrate the merit of the electric truck for irrigation construction work."

In department store routine the electric truck has become an important factor. Department store managers realize that extension of business is sure to result from the additional working capacity of the electric, as in many cases a saving has been made of a minute per a delivery.

Carson, Pirie, Scott & Company, one of Chicago's largest department stores, not long ago made its initial investment in electric trucks, putting twenty-three Detroits into service. After several months it made a second purchase of seventeen trucks from the General Motors Company and nineteen trucks from the Walter Vehicle Company, making a total of fifty-nine electric machines in its daily service. The second purchase indicates that the first fleet was entirely satisfactory. Eight months ago B. Altman of New York purchased three general vehicle trucks for delivery service. Four months later four more of the same make were ordered, and very recently a third order was given for an additional four. In eight months this firm has installed fifteen electric trucks at a cost of close to fifty thousand dollars, and believes that by so doing it will be able to make a big reduction in the cost of delivering packages. It is safe to assume that the company knew what kind of service the electric would give and how much of a saving would be effected before



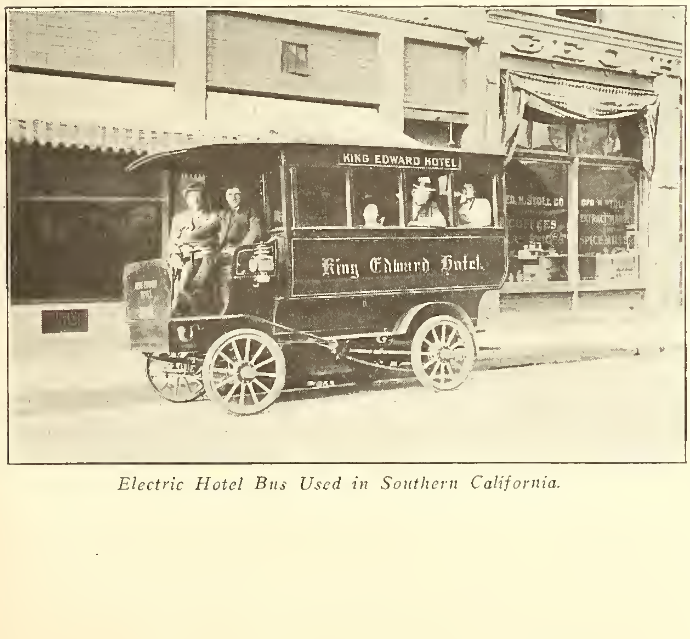
A Couple-Gear Tractor and Fire Apparatus Equipment.

making such an expenditure. The advertising value of the electric truck appeals to the department stores. Their customers are better pleased and prefer to have their goods delivered by electric wagons, for no woman enjoys receiving a package that carries an odor of gasoline or the smell of the stable. Such electric truck installations as Gimbel Brothers with 96; R. H. Macy & Company with 39; James A. Hearn & Son, 35; F. Loescer & Company, 26; Abraham & Straus Company, 20; Marshall Field & Company, 158; Arnold, Constable & Company, 16; Siegel-Cooper Company, 15; these are some of the larger installations in the daily service of department stores throughout the country where the electric truck is essential in obtaining continuous service.

A Two-Ton Lansden Truck Encountering a Steep Grade.

Electric trucks are used extensively by express companies. These companies demand a mode of delivery that produces rapid, continuous service, free from fire risk. The Adams Express Company has 320 electric machines in its daily service. The American Express Company has an installation of 253; the United States Express Company has 43.

That we cannot be too careful in using every means to safeguard the general health is being demonstrated by the large bakers throughout the country, who are making installations of electric trucks, and they, as well as the public in general, will be benefited if horse-drawn wagons and gasoline trucks are abandoned in favor of the electric for the delivery of breadstuffs of every description.



Electric Hotel Bus Used in Southern California.

The fire chiefs of several of the large cities, notably New York, Denver and Springfield, Mass., enthusiastically endorse the electric for fire fighting apparatus and prophesy that they will come into universal use in a short time.

In promoting the use of electric trucks a new method in Hartford, Conn., has been introduced—that of selling service with the trucks. The vehicle is sold without a battery and the owner charged a fixed rate per month for battery service. This is, as far as known, the first time a plan of this nature has been tried, and it is working very satisfactorily.

Under his contract, a user may operate his car twenty-four hours a day; the company provides one battery when another has worn out. In the case of cars doing a big mileage, two changes are frequently made in one day. The charge is based on mileage. For example, a 750-pound car is supplied with battery service at 5½ cents a mile, provided it is operated 500 miles a month. If the car is run 1,500 miles, the charge is 3 cents, and for 2,000 miles 2.6 per mile. Larger cars are charged in proportion.

The advantage to the user is that he always has battery service. Instead of boosting at noon if the battery is low, he runs around to the station and takes on another battery. On a 1,000-mile basis a patron of the battery service saves $12.00, or, in other words, it is cheaper by $12.00 a month to buy this service than to install a charging plant and buy current at 4 cents. Edison batteries are used. Space is sold in the garage at $100 a year, or $8.33 per month, the company looking after the car, the service including charging, oiling and greasing. Mechanical repairs and washing are extra. Nearly every car in the city is being cared for in this garage.

In the West the electric vehicle is entering the field with demonstrations of economy and efficiency. In Southern California the present electric garages are overcrowded. From January 1 to June 1 there were 152 electric vehicles registered in Southern California, and reports from the users are exceedingly satisfactory, in spite of the obstacles presented by the topography characteristics of that country.

The growth of the electric commercial vehicle is most remarkable, because a few manufacturers have had to make headway in face of the competition of a hundred manufacturers of gasoline trucks.

Let us continue to claim for the electric the advantages it surely possesses, being careful not to claim superiority in fields where it is not as yet superior, and let us show by our deeds as well as our words that we believe everything we claim.

E. V. A. Issues Valuable Booklets

"The Electric Commercial Vehicle" and "The Story of the Electric Pleasure Car" are the titles of two booklets which are being published by the Advertising and Publicity Committee of the Electric Vehicle Association of America. With elaborate colored cover designs and interesting cuts contained within, the booklets are intended to convey to those interested a basic knowledge of the electric vehicle and its accessories. The articles are written in lucid style and every vehicle owner and manufacturer of vehicles and their accessories should obtain a copy of each of these valuable publications, while central station men should, and doubtless will, make arrangements to secure a large supply of them for distribution to their vehicle customers and prospects.

Do Motor Vehicles Increase Accidents?

In a recent issue of the London *Times,* an anonymous correspondent makes an interesting study of traffic accidents in London, due to motor-driven apparatus, which is of great value in disposing of the popular impression that motor trucks are necessarily a public menace. While the investigation shows unquestionably that vehicle accidents have largely increased since motor transportation became general, it indicates also that the great bulk of it is traceable to motor buses, while an increase of almost four-fold the number of motor trucks has produced scarcely any material increase in accidents.

Just what the purpose of the correspondent is in drawing comparisons between motor trucks and buses in their deadly influence does not appear. Nor does it follow that what may be true in England might also be true in America, because a large part of the traffic figures has to do with "tram cars" and with more buses used in quite a different way from the way they are employed in this country. But, they are, nevertheless, interesting and possibly of value. The article, in part, is as follows:

In the course of the discussion on the report of the select committee on motor traffic two factors have been overlooked which are necessary to a proper understanding of the problem.

The first is that before 1906 the streets of London were getting safer, and that relatively to population there was a steady reduction in the number of fatal accidents due to street traffic. The other factor is that the recent increase in such accidents is peculiar to London, nothing like such a tendency having been experienced elsewhere.

LONDON'S TRAFFIC ACCIDENTS.

The following table, giving the number of fatal accidents from street traffic in the metropolitan police area, year by year, since 1893, discloses two tendencies of an entirely contrary character:

Year.	Deaths.	Year.	Deaths.
1893	172	1903	154
1894	169	1904	155
1895	155	1905	172
1896	130	1906	212
1897	165	1907	283
1898	145	1908	326
1899	207	1909	306
1900	179	1910	367
1901	186	1911	410
1902	175	1912	537

In 1893 there were 172 such accidents. Twelve years later the total was the same, although the population had in the meantime increased from 5,800,000 to 6,800,000, probably the greatest increase London has ever known over a similar period. In 1906 the accidents began to rise, and by 1912 the total had reached 537, an increase of 360 over 1905, with a rise in population to 7,250,000.

The explanation of these figures, which at first suggests itself, is that the earlier period was a period of horse traction and the second one of motor traction. But though 1906 was the first of the years of the high mortality period, it was by no means the first year in which motor vehicles formed a substantial part of London's street traffic, as is shown by the following table, which gives the number of motor vehicles licensed or registered since 1904:

THE MOTOR VEHICLE GROWTH.

	Electric tramcars.	Motor-omnibuses.	Motor-cabs.	Other Motor vehicles
1904	810	31	2	4,845
1905	1,124	241	19	5,771
1906	1,396	783	96	5,855
1907	1,768	1,205	723	7,616
1908	2,003	1,133	2,805	8,707
1909	2,198	1,180	3,956	8,982
1910	2,411	1,200	6,397	11,667
1911	2,665	1,962	7,626	14,076
1912	2,859	2,908	7,969	17,862

In 1904 and 1905, the last of the good years, electric tramcars and private motorcars were familiar vehicles in the streets, but the motor-omnibus and the motor-cab has made only a tentative and experimental appearance. The motor-omnibus era began in 1906, the motor-cab hardly becoming a serious factor until 1908.

THE BUS VS. THE TRUCK.

The effect of the motor-omnibus is seen when the street traffic accidents since 1906 are analyzed in such a way as to show the number of deaths caused by motor-omnibuses and the number caused by all other forms of power-driven vehicles:

Years.	Motor-omnibuses licensed.	Fatal accidents.	Fatal accidents per 100 omnibuses.	All other power-driven vehicles licensed.	Fatal accidents.	Fatal accidents per 100 vehicles.
*1906	783	25	3.19	7,347	51	.69
*1907	1,205	35	2.90	10,107	88	.87
*1908	1,133	62	5.47	13,515	97	.71
1909	1,180	59	5.00	15,136	113	.74
1910	1,200	70	5.83	30,475	158	.77
1911	1,962	114	5.81	24,367	188	.77
1912	2,908	182	6.26	28,690	208	.72

*Metropolitan Police district only.

MOTOR TRAFFIC NOT DANGEROUS.

This table disposes of the popular notion that motor traffic as a whole is getting much more dangerous, and it also explains how that delusion has arisen. The analysis shows that while each individual omnibus is twice as deadly as it was in 1906, there is no appreciable deterioration in the safety of other motor vehicles. Between 1906 and 1912 the number of motor-omnibuses licensed increased by 271 per cent and the fatal accidents caused by them by 628 per cent. During the same period the number of all other power-driven vehicles increased by 290 per cent and the fatal accidents caused by them by 306 per cent.

But the problem is not only a very new one in London; it is peculiar to London. In the county of London (with the city), having a total population of 4,521,000, the fatal accidents caused by street traffic were 281 in 1910 and 422 in 1912, the increase thus being 141. In nine other large cities (Glasgow, Liverpool, Manchester, Leeds, Sheffield, Dublin, Belfast, Bristol and Edinburgh), with an aggregate population of 4,613,000, the number was 168 in 1910 and 179 in 1912, an increase of only 11.

STREET CAR ACCIDENTS.

To some extent it may be true that the motor-omnibus is not really so bad as the statistics make it out to be and that it is blamed for accidents which would not have occurred but for other vehicles. But it is also true that fatal accidents are attributed to other vehicles, such as taxi-cabs, tramcars, and private cars, which would not have occurred but for the motor-omnibus; and a study of inquests on the victims of street traffic accidents indicates that a substantial proportion of the deaths attributed to private motor-cars, taxi-cabs, and other vehicles would have occurred but for the fact that the victim in the moment of imminent danger ran under the wheels of the other vehicle while endeavoring to avoid being run over by an omnibus.

NOVELTY AND MILEAGE.

So far as any attempt has been made to explain the deadliness of the motor-omnibus, it is made on two grounds—one, the novelty of the vehicle; the other, its increased mileage as compared with the horse vehicles.

As to the defense of novelty, can it really be said that the motor-omnibus is a novel vehicle? There were 783 licensed in 1906 and 1,200 in 1907. The novelty ought, at any rate, to have begun to wear off by now. But the figures show that the longer the omnibuses have been on the streets the more deadly they have become. In 1906 the fatal accidents were 3.19, in 1907 2.90, and in 1912 6.26 per 100 omnibuses.

The defense of increased mileage gives no greater comfort. Mr. Stanley of the London General Omnibus Company, informed the select committee that the aggregate daily mileage of his motor-omnibuses was 51 per cent greater than the mileage of the horse omnibuses in 1901, although the vehicles employed were 462 fewer in number. But the increase in fatal accidents caused by the motor-omnibuses over those caused by horse omnibuses for the same period was not 51 per cent, but 691 per cent.

"An especially designed General Electric motor built to withstand 500 per cent overland and of 1,200 revolutions a minute is part of the regular equipment of all Borland electric trucks," says William Little, sales manager of the Borland-Grannis Company of Chicago.

ELECTRIC VEHICLES

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CHICAGO, DECEMBER, 1913

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THE GIFT PAR EXCELLENCE.

WHEN the Christmas spirit comes, just about two weeks ahead of the great holiday, the American husband or father suddenly begins to cast desperately around for some token which shall fitly express his deep sentiment.

The fortunate individual to whom price is no consideration, who contemplates with equal *sang froid* the expenditure of one dollar or ten thousand, sees spread before his appraising eye practically the whole market. His only task is to decide on what he shall exercise his purchasing power. But the man who feels that his gift must show real value, must evidence perhaps by its very price his personal sacrifice in its buying, has a more limited field. There are really very few classes of gifts suitable for the ladies, whose cost—and worth—range to a few thousand dollars. Of course, there are pearl necklaces and diamond tiaras, and all the rest of the cunningly devised bits of personal adornment that give a thrill of pride in their ownership; but that is all they do give, and once vanity is sated they become a hollow joy, indeed.

So if one would give pleasure that lasts through the years, a gift that is at once the essence of aristocracy and the substance of usefulness, the constant creator of new joys as well as the old pleasure of possession, the best evidence of concern in the recipient's happiness and her opportunity to give pleasure to others, there is but one selection possible.

An electric car is the Christmas gift *par excellence.*

THE ELECTRIC ROADSTER.

THE electric coupe, with its graceful lines and luxurious trimmings, has appealed to a great many people. Nevertheless, there is a certain type of buyer constantly demanding a high-class, open car, which provides the quiet and ease of control characteristic of the electric vehicle, together with that element of being open to the fresh air that is so often insisted on.

In view of producing a car that will appeal to this class, manufacturers have built the electric roadster, the car with enough rakishness in its lines to make it a favorite among men and sufficiently dignified and exclusive in its complete appointment to make it highly popular among women of the best class.

The electric roadster may be termed the ideal car for touring. Constructed for greater speed, this particular type has an individuality which causes it to be viewed with approval by the man on the sidewalk. It possesses the essentials for long and satisfactory service and the maximum of pleasure-giving qualities. Void of the inconvenience, dirt, noise, labor and excessive cost of maintenance of its gas prototype, the electric roadster is the answer for pleasure tours or business calls—the one up-to-date and efficient method for such travel.

COURSES ON ELECTRIC VEHICLES.

THERE has been considerable agitation as to the adoption by technical schools of a course on the electric vehicle, especially relative to the storage battery and its proper up-keep; also the motor and controller, and their separate operations. Not only has the topic been suggested, but in a number of instances such courses have been actually promoted.

The electric vehicle involves in its construction and operation a great many engineering problems, the knowledge of which heretofore has been obtained only after years of practical experience, which, condensed in book form, could be successfully taught to students in a much shorter time.

The electric is fast filling the cities throughout the country. The garages find it necessary to hire those men who have a knowledge of this type of vehicle. Such men are hard to find. Those having such knowledge find better employment in the engineering departments of the manufacturing plants throughout the country. There is a growing demand also for men who can take charge of the electric garage—men who understand batteries and the proper methods of charging them. From those colleges which teach a course relative to this industry, well-trained men, technically educated on these subjects, will be prepared to step into the garage, the vehicle technical construction departments, the battery depot, and the central station, with its many demands for men with battery knowledge.

The installation of a course of this nature should be adopted universally, in order that accurate knowledge of the vehicle and its accessories will be available at all times.

WE ABSORB ANOTHER PAPER.

BEGINNING with this number, several hundred subscribers to the *Northwestern Automobile Trade Review* of Minneapolis, Minn., will receive Electric Vehicles in lieu of that publication.

The *Northwestern Automobile Trade Review,* a monthly trade magazine, was started early in the year by C. A. Stedman of Minneapolis. It was promptly recognized as an excellent little paper of more than local interest, and seemed to promise a profitable future. But, as is well known, the field of any new gas-car paper is particularly hard, and competition is extremely aggressive and severe. The mere fact that subscriptions poured in plentifully was not enough to establish that commercial solidity necessary to continued publication. As a result, Mr. Stedman opened negotiations last month which resulted in the absorption of the *Northwestern Automobile Trade Review* by Electric Vehicles, with all its subscribers and good will.

The subscription price of the *Northwestern Automobile Trade Review* was $1.00 per year. The subscription price of Electric Vehicles is $1.50 per year. Unexpired subscriptions to the former paper will be filled by Electric Vehicles *pro rata*—that is, on a basis of eight months for twelve.

Beyond fulfilling these unexpired subscriptions on this basis, Electric Vehicles assumes no responsibility for any obligations of the *Northwestern Automobile Trade Review.*

ELECTRIC MACHINERY ON AUTOMOBILES.

BEFORE the American Institute of Electrical Engineers last month were read three papers on the general subject of electric machinery on automobiles. For it is to be noted that the modern gasoline passenger vehicle contains and uses more distinctly electrical contrivances than any genuine electric vehicle ever designed.

First, of course, there is the ignition system, which, without electricity, would be but a meaningless part of a dead engine. Then there are, of course, the several lamps, to be illumined electrically, if one would be at all proper. An electrical self-starter is now a necessity on all well-appointed cars. Electro-magnetic gear shifts are being looked upon with favor and have become standard equipment on some new models. Electric horns, of course, are an old story and well established. And now comes one more appliance, an electric vaporizer for the carburetor. No doubt electric brakes and clutches will appear in another year.

Thus, while the electric vehicle gets along very nicely with only enough gasoline to clean its upholstering once a year or so, it is obvious that the gasoline vehicle positively could not exist, as a going concern, without electricity. Furthermore, if its electrical applications continue to multiply, we may seriously consider if the ultimate electric plant of a gasoline car may not wax big enough to put the gas out and take the wheel itself.

Properly considered, of course, every additional dependence of gasoline or electricity is straight evidence that the latter is the only dependable motive power, the real *multum in parvo,* for electricity does all its own work. It drives the car, lights the lamps, blows the horn and warms the interior of the closed body, all from the same battery; and if it is desired, it can operate its own brakes besides.

To the car-owning layman, the word "electricity" still holds considerable of mystery, and a suggestion of head-aching complexities of study. He may, therefore, be surprised to learn that the electrical circuit of a battery-driven vehicle is quite simple and readily understood without effort, while the electrical circuit of a modern gasoline car is complicated indeed, and deals with more than one variety of electric current.

ELECTRIC A WINTER CAR.

Milady's gowns are to be of extremely light and delicate texture this fall and winter, say the arbiters of style and fashion. That means the necessity of greater protection from the rigors of the season while driving about in pleasure vehicles. As a consequence, electric car builders are advancing strong, logical argument in support of their products for cold weather driving. The Chicago Electric offers extreme comfort and convenience, particularly at these times, according to Penrose Reed, general sales manager of the Chicago Electric Motor Car Company.

This Chicago-made pleasure vehicle is fact becoming known throughout the country as the "electric with the arched door," because it is the only one constructed with this distinctive door design.

"This is the season of closed cars," said Mr. Reed, "and the electric is the logical choice. Even if fashion did not dictate filmy garments, men and women driving at this time of year demand extreme comfort and convenience.

"In the construction of the Chicago electric every effort has been made to enhance the warmth and comfort of the occupants. The control system of the car is of such a character that the operator can apply power and cut-off and can operate the brakes entirely with the hand control lever. This eliminates the necessity of using the foot brakes and protects the feet from dangerous exposure. The man or woman driving in the fall and winter can keep his or her feet robed all the time. This feature is particularly appreciated by women who use an electric to attend theater or social functions where social form requires gowns such as the fashion-makers are talking about for this winter.

"The construction of our control lever allows the speeds to be operated with ease and safety, and permits the use of the entire width of the seat. There is, consequently, no chance for opera cloaks, vails or furs becoming entangled."

Co-operation by the Central Station

Paper Read Before the Fourth Annual Convention of the Electric Vehicle Association at Chicago

BY E. L. CALLAHAN

FROM the viewpoint of the electric-vehicle manufacturer, the principal objects to be attained through co-operation are: the greater satisfaction among vehicle users, the reduction of their operating difficulties and the resulting increased sales, also the vehicle sales made possible by the good example established in the use of vehicles by the electric-service companies and because the service companies are in a position to advise the manufacturer of live prospects for the purchase of electric vehicles.

From the viewpoint of the electric-service company, the advantages to be realized are:

The promotion of the sale of electricity, thereby increasing revenue.

Improved operating conditions; *i. e.,* through obtaining a considerable "off-peak" changing business the central-station load-factor is improved, and the cost of production reduced.

Advertising; the service company feels that every electrically operated machine, be it an automobile or a buzz-saw, is an advertisement instrumental in bringing new customers to its lines.

Furthering the interests of the industrial and social progress of the communities in which the central-station company operates, for any improvement in civic welfare is ultimately reflected to the service company either in improved surroundings and æsthetic betterment, or in good, round dollars.

These are the chief reasons for co-operation, I believe, and are worthy of consideration.

Fundamentally, there appears to be only one logical point of contact between the electric-service company and the electric-vehicle user, that is, the sale of current for charging. Is it not rather strange that the central-station companies are asked to render assistance in making the sale of a machine in which they are interested in only one item of its operation? The total annual cost of current for operating electric vehicles is seldom as high as 10 per cent of the total annual cost of owning and operating same. Can the central-station company, therefore, be expected to carry any great amount of the burden when it receives less than 10 per cent of the money spent by the customer? Do the gasoline manufacturers lend any material assistance in the sale of gasoline cars? The gasoline manufacturers receive a far larger part of their total revenue from automobiles than do the electric-service companies. However, the electric-service companies are vitally interested and will co-operate with the vehicle manufacturers, thereby doing their part in advancing the electric-vehicle business to the mutual advantage of all concerned.

A Fleet of Five G. V. Trucks in Daily Service.

From the customer's viewpoint, the most conspicuous advantages accruing from the use of electric vehicles are: the ease, convenience and graceful luxury of the pleasure vehicle; the low operating expense, increased radius of operation and general fool-proof construction of the truck, and of both the simplicity and freedom from breakdown, the absolute reliability and the avoidance of expensive attendance.

What can the service companies do to emphasize these characteristics or bring them more forcibly to the attention of the public?

First, by setting a good example. I understand that the Commonwealth Edison Company of Chicago has about 100 electric trucks and is greatly pleased, not only with their performance in delivering material and for general transportation purposes, but equally well with the advertising gained by their use.

It often occurs that, in buying automobiles for electric-service company use, the choice of cars is left to the discretion of the purchasing agent, superintendents, or men not *directly* interested in the development and increased output of the company. Therefore, in selling electrics to central-station companies, the salesman should go to the manager and to the commercial department and to the men who are interested in advancing the welfare of the company and the city—not alone to the prospective operatives of the machine, who, perhaps, are more interested in the joy rides they may be anticipating or the noise they may be able to make with an open exhaust in a gasoline car. From the viewpoint of a driver, an electric may have advantages over gasoline cars or over horse-drawn vehicles, or it *may not,* but from the viewpoint of the man selling electricity and responsible for the advancement of the use of electricity, there is no alternative but the electric vehicle within its proper sphere of proven usefulness.

Second: there is the consideration of cost of operation. A great deal of comment (to use a mild term) has been made relative to the failure on the part of electric-service companies to lower their rates for current to charge electric vehicles. It has been urged that the excellent character of this load and the assumed inexpensiveness of producing such service have been ignored. There are probably some service companies charging rates out of proportion to the cost of this service; however, these are among a fast-declining minority, and they are gradually coming to a realization of the advantages of proper rates.

Let us see what advantages may be derived from lower rates for charging. I find that the cost of practically every other commodity incidental to the vehicle industry is increasing in price—and, as an example, of this, I would mention gasoline—while the cost of electricity has been lowered, not slightly, but, in some cases, as much as 50 per cent. In arguing for lower rates, it is cited that the vehicle-charging load is an "off-peak" load, and so makes no demand upon the central-station's capacity. This is largely true and deserves careful consideration, but, on the other hand, the service company's investment is not only in generating equipment, but also in lines and transformers, and the amount of such investment is often about equally divided between the generating plant and distributing system, including transformers, meters, etc. A garage requires just as much capacity in lines and transformers as any other load of similar size, and, in the case of private garages, the line requirements are often very much heavier than for other customers using a like quantity of current, notwithstanding the "off-peak" character of the load. Under such circumstances only a slight reduction in rates, if any, below those charged for other classes of service is justifiable.

A recent study of rates in a city of 325,000 inhabitants resulted in the establishment of a rate for charging of 3.8 cents per kilowatt-hour for the first 1000 kilowatt-hours, and reduced thereafter for larger consumptions. But, after all, what inducement does reduction in rates hold out to vehicle users? From various sources, including the classic work of the Massachusetts Institute of Technology, the Report of the School of Mines of Columbia University, and others, it is found that the cost of current for charging is very seldom as high as 10 per cent of the total cost of operation, including proper interest and depreciation charges, and by proper depreciation charges I do not mean the exorbitant rates that may grow out of the mind of some warped economist, but the rates adopted by the most eminent authorities. The cost of current for charging being, therefore, less than 10 per cent of the total cost of average trucking work, a 20 per cent reduction in the price of current would mean less than a 2 per cent reduction to the vehicle user in the cost of operation—truly an insignificant portion of the total expense.

It has often been suggested that electric-service companies should taken an active part in the sale of electric vehicles, that they be displayed in showrooms, demonstrated by the selling force and advertised as are other current-consuming devices. It has often been suggested that central stations might well abandon the electric flatiron, with its "insignificant consumption" and turn their energies to the sale of electric vehicles, "using many times as much current." In discussion of this suggestion, I would say that the sale of a flatiron increases the company's annual revenue by almost three times the price of the iron, while the electric vehicle increases the annual gross by only about 6 per cent of the selling price of the vehicle, that is, a flatiron selling for $3 will produce an annual revenue of $8, while an electric truck selling for $3,000 results in an average annual revenue of only about $175. A flatiron produces a revenue equal to its original selling price in about 4½ months, while an average electric truck requires about 17 years and a pleasure vehicle about 25 years.

Another excellent reason for the service company not going into the automobile-selling business is that it is too foreign to the business of the company, requiring a separate organization and not naturally falling in any wise within the scope of the service company's functions. It may often occur that the central station has a garage for its own machines and may find it expedient to care for a few other vehicles; in that case, if the business is found profitable and works no hardship upon independent garages, it is certainly a commendable plan, but such a garage might equally well have been established and operated by any other interest. Likewise, if the service company finds that it can sell machines as a profitable business and without interfering with its patrons, all well and good, but the central station should not be asked to sell or provide garage facilities for electric vehicles with the expectation of a profitable return from the increased electric revenue.

It has often been urged that service companies might do extensive advertising and sales work in co-operation with the electric vehicle manufacturers. A great many service companies are doing this on a large scale, but let us see how far they should go into this matter. A live central station interested in developing its business, to-day spends about 2½ per cent of its gross revenue in soliciting and advertising, or it is found to be necessary in getting business and in advertising to spend about 25 cents for each $1 of increased annual revenue. On the same basis, the central station would be warranted in spending about $45 in obtaining an electric-vehicle customer. This includes the advertising and soliciting of unproductive prospects, as well as actual purchasers, and is based upon the revenue from a commercial vehicle. Considering the revenue from a pleasure vehicle, estimated at $80 per year, the permissible expense for advertising and soliciting becomes about $20. It is quite possible that when the desirable nature of this load is fully realized and the advertising incidental to the use of the electric vehicle and the general improvement in commercial and civic conditions is taken into consideration, that central-station companies might be warranted in spending as much as $60 for each commercial truck and $25 for each pleasure vehicle placed.

It should be remembered that part of this expense is necessary after the sale is made in arranging for contracts for service, purchase of charging equipment, etc. This probably seems like a small contribution when compared to the efforts made by the electric-vehicle manufacturers; but there is another side of this question. The actual amount of money wihch the electric-service company appears to be justified in spending would not be a fair measure of its efforts toward the larger sale of electric vehicles, for service companies have complete working organizations in close touch with every industry in their respective cities and are already doing business with practically every industry. The electric-service companies have the confidence of their customers, and their representatives are looked upon and referred to as authorities on related commercial and engineering questions. More, by far, can be accomplished in the advancement of the use of electric vehicles through these representatives than with the same expenditure of energy through any other channel available to the central station.

I will undertake to outline a plan of co-operation in the form of a few well-meant suggestions addressed to the vehicle manufacturers.

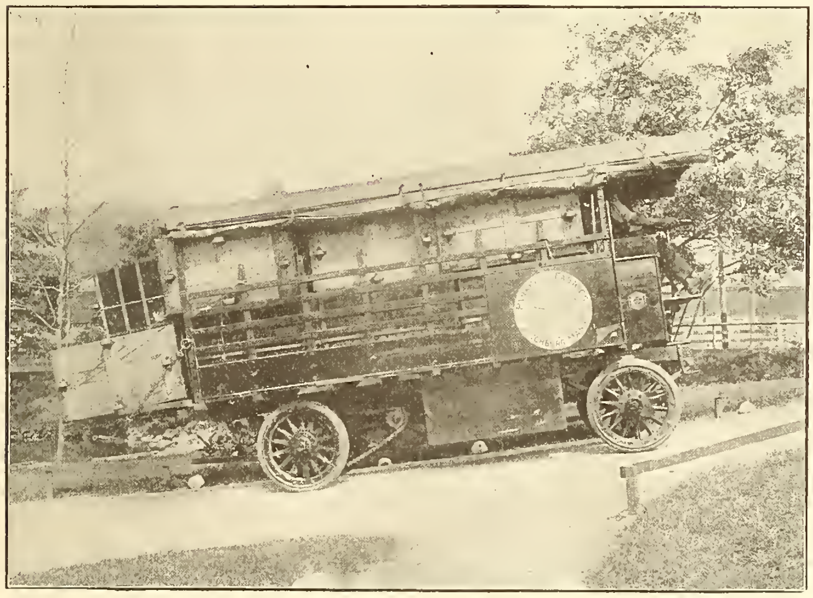
First. Do not waste your time in an effort to obtain a reduction in electric rates; the entire elimination of the cost of current for charging would result in a saving of only 10 per cent of the total expense of operation and ownership.

Second. Do not expect the central station to sell your cars for you, or to spend unreasonable sums of money in advertising electric vehicles. Do not urge the displacement of revenue producers that are, at present, many times more effective, to make room for electric vehicles.

Third. Do not expect the electric-service company to go into the garaging business for the purpose and with the expectation of obtaining the profit of the business from the sale of current.

To urge any of these measures will only waste your time and that of the central-station manager, and delay genuinely productive co-operative efforts.

In the foregoing, I do not want to be over-critical, but there has been so much unfounded criticism of the central stations because of their "failure to assist the electric-vehicle manufacturers," that I believe my statements have been warranted. I believe that many electric-service companies have been very slow to take up and push the sale of electric vehicles as it should be pushed, and that, thereby, they have failed to grasp an excellent opportunity to co-operate with you to mutual advancement. I now wish to offer a few suggestions, which, I trust, may lead to better co-operation and speedier recognition, on both sides, of the benefits to be derived therefrom.



A G. V. Truck in the Service of the Parkill Fabric Company.

First, there are about 1500 copies of the Electrical salesman's Handbook, published by the commercial section of the N. E. L. A. (new sheets for which are issued quarterly) in the hands of as many central-station power and lighting solicitors, each daily calling on the manufacturing companies and other big industries in his city. This loose-leaf book contains accurate data on the consumption of current, and a description of the application of electric power to the various miscellaneous industries. The book is very instructive, highly esteemed and constantly referred to by both the solicitors and their prospective customers in determining the merits of electric power. Only a limited amount of data on the subject of electric vehicles is contained in the book at present. It should contain a geat deal more and of a very comprehensive nature. An immense quantity of such data is available, but has never been offered to the commercial section. The commercial section recommends, therefore, that the Electric Vehicle Association appoint a committee to collect the most reliable and dependable data available, showing the cost of operating electric vehicles in various classes of work, the saving and increased efficiency that may be effected, giving briefly the information required by a prospective customer in making an intelligent decision in solving his transportation problems. This data, if properly compiled, will be recommended for publication and distribution by the commercial section to its membership.

Second. Under present conditions, I believe you will agree with me that only a very small part of the advance information received by vehicle manufacturers concerning prospective purchasers of vehicles originates from the central station. The exact reverse should be true. I would recommend, therefore, that in approaching central-station companies the manufacturers urge that the central-station representatives—new business men especially—be instructed to report all prospects which come to their attention. These men spend practically all their time among the very people that the manufacturer is trying to reach and should be able to render considerable assistance in giving advice to prospective vehicle purchasers.

Third. A great many electric-service companies credit their commercial men with contracts signed and so rate them for promotion, advances in salary, etc., and, in some cases, give them a monetary commission for such contracts. I do not, however, know of any company crediting its men with the placing of electric vehicles. In central-station work, the greatest credit is given the solicitor or salesman who displaces or prevents the installation of an isolated plant. Then why should not the salesman have credit for placing an electric vehicle, which surely displaces an isolated plant—a gasoline engine of from 20 to 75 horse-power capacity? I earnestly recommend that the central station be shown that just as much credit should be given for the placing of an electric vehicle as for a contract for any other power of similar character. True, the central-station company now gives its salesmen credit when a rectifier or charging equipment is contracted for, but it should be remembered that the revenue is not proportional to the number and capacity of rectifiers or charging equipments installed, but to the number of *machines* charged, whether they be charged in individual private garages or all at one place. The giving of proper credit to salesmen by central stations for the sale of, or for being instrumental in the sale of, electric vehicles will be equivalent to the addition of several thousand vehicle salesmen to the force now at work in the field.

Fourth. Wherever such a step is feasible, it should be recommended to central stations in the cities of medium and small size that an inspection department be maintained for the purpose of examining vehicles without cost to the consumers and giving owners whatever technical advice they may desire. This cannot be made a general recommendation, because I do not believe that it applies to all central stations or communities, and would be unwarranted and impracticable in large cities.

Fifth. For the purpose of instructing and educating central-station employes in the construction and operation of electric vehicles and in the advantages to be derived from their use, that the manufacturers co-operate with the central stations by offering a brief course of instruction, preferably at the manufacturer's plant. This should compare, on a small scale, with the lecture courses now offered by the large manufacturers of electrical machinery. In many cases, it would be found more expedient to have the manufacturers' representatives co-operate in person with the sales department and central-station employes on the ground and actually in the field of operation.

In concluding, I wish to invite the frankest possible comment and criticism and to ask that any and all suggestions that you may have to make on this very important subject be offered freely and fully. I can assure you, speaking for the commercial section of the National Electric Light Association, that the progressive electric service companies are willing and anxious to co-operate with you in every feasible way for the advancement of the electric-vehicle industry and that they will be only too glad to take up and adopt any reasonable suggestions that are offered and to meet you more than half way.

Mr. Marsh: It struck me that Mr. Callahan first threw down the electric vehicle very hard, and a little later he got sorry for it and said it was pretty good after all. It might be interesting if we could hear from some of the central-station men who have co-operated in the introduction of the electric vehicle as to whether they have found it profitable or not, and what they think they shall do in the future in that way. Mr. Callahan says: "Can the central-station company be expected to carry any great amount of the burden when it receives less than ten per cent of the money spent by the customer?" In fairness to the electric vehicle people we ought to remember that the central station, while it gets that revenue for one year, will continue to get it for a good many years, and it will not only continue to get it from one manufacturer but it will continue to get from the efforts of all the manufacturers of electric vehicles, so that in the long run I believe the central station gets more gross revenue than the vehicle man. Mr. Callahan spoke of the demand upon the central station's capacity. We must remember that in the case of a public garage the maximum demand will approximately continue for about seven hours, so that the central station is well repaid for the outlay, aside from the fact that it comes at a time of the minimum load upon the central station. And in the case of the private garage I imagine that it continues most of the night, and the earnings from an ordinary electric will be a greater amount than the earnings from the lighting of the private residence, including the flatirons and all the accessories. I don't believe the average house will average five to seven dollars a month for lighting and incidentals, and I think the central station figures would show that the income from electric vehicles per residence is greater than the total lighting bill. I think we already have some very accurate figures. Mr. Callahan speaks about the flatiron revenue: "A flatiron selling for three dollars will produce an annual revenue of eight dollars." I am glad to hear that it produces that much, but I think that the annual income from an electric truck selling for three thousand dollars is greater than one hundred seventy-five dollars. I would like to hear from some of the central station or electric vehicle men on that point.

Mr. Mansfield: I would like to know what co-operation means. I begin to believe there isn't any such thing as co-operation. We have a number of papers on the co-operation between various interests, and under that head we have a lot of reasons why they should not co-operate. This illustration speaks of a certain income as a certain per cent of the cost of the apparatus. I don't quite see how that applies. It seems to me it should be a per cent of the cost of selling it or getting it marketed rather than of the price of the commodity itself. Whether the central station can afford to spend a certain amount of money putting electric vehicles into their establishment isn't the thing we are interested in. The question is, Do they want it? Do we want irons? Do we want motors? Do we ever want them? There was a time when the central station was a new institution; when they didn't know whether they would ever be able to pay dividends on their capital. They began to take up different lines of business and every one has been successful. I will venture to say that in a good many cases they spent more money in bringing in a certain class of business than they got out of it for perhaps a year or two. I think the answer is that the central stations which have been willing to spend some money in helping the manufacturers are the ones who are beginning to get results, and the ones who think they can't spend more than a certain per cent to bring electric vehicles into their territory are the ones that are getting no results, or at least negligible results. Now, if the electric vehicle is more economical than either the horse-drawn vehicle or the gasoline, it doesn't seem to me a very great hardship for the central stations to use them themselves, if they haven't got any money to spend to help sell them, and save a little money that way and put it in the treasury.

I am not talking entirely on the side of the manufacturer. I believe in the central station's side as well; and I do believe that the manufacturer should hold out his hand, and I do believe also that the central station is going to recognize that it is a good business. I don't agree with the view that it costs about as much for service and equipment if you have a garage as it does other kinds of business, because it doesn't. It seems to me we are comparing these things rather too much. What we want is to build up the business. We want to be constructive. And if the business is worth going after, let us get together, as I said before, and decide how we can do it; and the central stations who haven't come into it, let us give them some information. I believe that there ought to be a committee or a bureau of the Electric Vehicle Association which will give to the central stations various grades of figures showing how they can carry on a campaign for a thousand dollars, or fifty cents. Give them figures that they can work on, something definite.

Mr. Hunnewell: I think Mr. Callahan is wrong in his premises in comparing the income from a vehicle with the cost. As evidence of the profit to the central station on the promotion of the use of electric vehicles, I will quote from our own experience. We have been in the business two years. Our net profit is about three hundred per cent of our operating cost, that is, the cost of conducting the business. Therefore it is good business to go after. The statement has been made that the vehicle manufacturer benefits more than does the central station. If you analyze the figures as published by the committee on Operating Records it will be found that the income from current bears the same relative value to the investment in the truck as it does to the annual operating cost. Taking that at ten per cent, the central station in ten years secures the same amount of money as does the vehicle manufacturer on the first sale. Therefore they both profit equally on the sale of the vehicle.

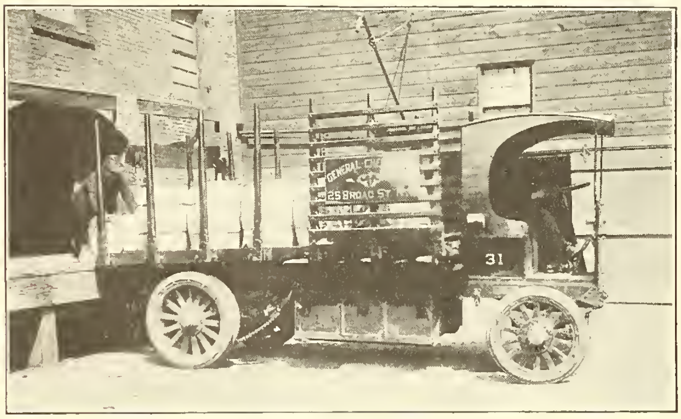
Mr. Smith: I would like to call to Mr. Callahan's attention the fact that last year I took up personally with the commercial section the matter of including within its handbook some data on the electric vehicle. I presented for its consideration in a very forceful way, at least as forceful as I could, the extreme necessity for the National Electric Light Association, through its commercial section, recognizing the importance of the electric vehicle. Nothing has been published by the commercial section on that subject as yet. I have taken up recently, with Mr. Jones, the present chairman of the commercial section, that same subject. I am glad to see that Mr. Callahan speaks on behalf of the commercial section to co-operate with this Association and publish data with regard to the electric vehicle, and we will be very glad to provide data that will be helpful along that line.

Mr. Day Baker: Data in regard to the electric vehicle and the care of batteries and everything of that character has been very hard to obtain in the past. A little handbook on the electric vehicle which is to be published very shortly contains a large amount of instructive data on the method of handling electric vehicles. It doesn't take up any one special vehicle or any one special make, but it takes up all kinds of batteries and vehicles, both commercial and pleasure. This book, which is called the "Handbook of Electric Vehicles," will prove a very valuable acquisition to every central station manager and to everyone soliciting business for the central station.

MR. KENNEDY: I would like to draw attention to a couple of points which haven't been mentioned in connection with the criticism of how difficult it seems to get the central station organization to use electric vehicles. A remark was made that the greatest opposition to the introduction of electric vehicles in the organization of central station companies comes from minor or subordinate executives. Now that is true, but in order to cope with the situation and find the solution for the difficulties existing, we ought to analyze it and see why it is that the subordinate executive objects to the electric and prefers the gasoline. There is another point to be considered—that when an electric vehicle or a group of electric vehicles are used by central stations, they are used for very different functions from those in which the vehicle is employed in a commercial institution. When the merchant buys a collection of electric vehicles or motor vehicles of any kind he uses them for transportation of merchandise from point to point. The central station, when it buys electric vehicles or other motor vehicles, uses them as auxiliary tools, usually, to one or a group of workmen in construction, motor inspection, arc lamp cleaning, line work, etc. Under such circumstances the basis of comparison of the outlook of the electric vehicle is different from what it is when you consider commercial application.

Now why is it that the subordinate executive opposes? In the central station you may divide the work, as far as the conduct of it is concerned, into two divisions: One, the administration, largely responsible for general conduct of the business and the matter of revenue on the capital stock; the other, subordinate executives who are engaged in the execution of the business. The organization is divided up into a number of groups. There is the construction department, the operating department, the service department, and so on. In the central station organization the character of the make-up is a little bit different also from the mercantile institution because the administration has to put tremendous reliance upon the subordinate executives for the execution of the work delegated to them, so that the subordinate executive is a much more independent man in an institution such as the central station than he is in a commercial institution. He has to perform his work no matter what it costs and under circumstances that are very different from ordinary commercial operations; and consequently, the administration, having put upon him the responsibility for the performance of his work, is not inclined to stipulate to him how he shall do it or what tools he shall employ or to force him to carry out something that may be a part of the general administrative policy. Now, if you take up the matter of proving that the electric vehicle can perform the work more economically, then you get up against a lot of obstacles. There is a man engaged in cleaning arc lamps along the street. The lamps are very close. It isn't easy to show from an economic point of view that the electric vehicle is going to be very much more serviceable or economical to him than the horse vehicle, because the vehicle practically goes from post to post. Nevertheless there is an economic consideration there if we go a little farther. Analyze the situation thoroughly, and you will recognize that the cost of operating the electric vehicle is almost in direct proportion to its movement. When you get into considerations of why the gasoline vehicle is used in the central station organization you find that emergency or territorial work of a constructive character largely influences the selection of the gasoline car. "While we recognize that that work was formerly done by horses, and the man consequently ought to be able to do it very much better with electric vehicles than he did with horses, yet since he has become accustomed to doing it with gasoline vehicles we are not inclined to slip back to the perhaps lesser expediency of the electric," and the answer is that that division of the organization is working today on a very much more intensified scale than when it was working with horse vehicles. In other words, when the horse vehicles were superseded by gasoline vehicles the subordinate executive, responsible for the performance of its work, has discovered that he can do a great deal more with the men and means at his command, and he is expected to keep up that performance; and having once established the standard, or established a maximum performance, he is expected to keep it up; and consequently, he recognizes his responsibility if he should slip back to the employment of a vehicle that would do the work less expeditiously, and he is not inclined to make the change. Now I often ask the executive or the principal man who is working at this problem in a casual way, and who may be more or less familiar with the details, if he were loosed entirely from his other responsibilities and the solution of this particular problem were inflicted upon him, whether he could get down and solve it; and the answer is that he could. If the subordinate executive were inclined, if he knew as much about the electric vehicle as you do, and the modifications that are possible in the equipment, in the employment of extra batteries, perhaps means for making emergency speeds, I think it would be quite possible to have electric vehicles applied even to the distant constructive work; but he couldn't do it very well with the standard vehicle as sold at the present day nor by the use of a single battery equipment. There is a solution to the problem of applying the electric vehicle, provided the central station organization of that minor executive is willing to do it. If the administration were willing to pursue a policy of immediately adopting the electric vehicle, whether it paid or not, in many of its minor applications, and charge that loss to the expense of propaganda or the operation of introducing electric vehicles, we might be able to get them in many cases to see ways and means by which we could carry on what we would like to have them do, that is, to apply electric vehicles universally. I think it is hardly fair to pick out some particular central station that happens at this day to buy ten or fifteen gasoline vehicles —I don't know anything of the particular circumstances mentioned, but it may so happen that that central station is engaged in some new construction work over extensive territory, and that it is just commencing to use motor vehicles, and in using these gasoline vehicles it is simply copying the example that has been shown in almost all the large central stations. There is hardly a central station of large size in the organization that isn't using gasoline vehicles in its departments somewhere, so that there is really a reason for the present attitude that we find, and there are ways and means by which this situation can be changed.

MR. RICE: I sympathize a good deal with the feeling that Mr. Witherby has expressed, when I can say that in my own city of Indianapolis we have been manufacturing vehicles for sixteen or seventeen years, and the electric light station there has yet to buy its first pleasure or commercial vehicle. I can sympathize on the other hand with our friend, Mr. Davenport, of Providence, who told you how, if we make cars for a thousand dollars or twelve hundred dollars, there would be a big sale for them. I happen to know of a man who at this very moment has plans and figures whereby he expects to sell an electric car for less than a thousand dollars, considerably, and he is quite ready to prove that it can be done. Now maybe it can. But the point that I want to make is that we should both, the central station and the manufacturer, push the car as it is because the manufacturer is making that car just as well as he knows how at the present time. He is also spending every ounce of energy and almost his last cent in advertising. Mr. Callahan cites the central station that spends two and a half per cent of its gross income in advertising and soliciting. If there is an electric car manufacturer that isn't spending six per cent to ten per cent of his gross income on advertising alone, not to say anything about the soliciting and sales side of the question, then I don't know what they are doing, because I can judge what they do by myself, and I know what the gross sales are. We are spending two or more times more than any business can stand—but that is neither here nor there. We are doing it because we think we ought to. I simply mention it because the electric vehicle manufacturer, whether pleasure or commercial, is doing the best he knows how at the present time. We may do very foolish things. Perhaps we are spending it, as Mr. Davenport said, for hand-painted catalogs or for advertising in the *Post* and other expensive mediums, but nevertheless that is according to the best lights of the vehicle manufacturer at the present time. Now I know that the central station people are also spending a good deal of money. Many



Atlantic Three and One-Half-Ton Truck in the Service of The General Chemical Company of New York.

years ago I knew several stations who invested in big—at that time—charging apparatus. While they expected to get almost nothing back—they hardly got the interest back on the investment—they helped the thing along as best they could. But I know that many, many of them are lukewarm and don't see the advantages. It would be possible, as some have started to do, to call attention to quite a few discrepancies in the statements made in these papers, but every time I read them I learn something from them. I got a new viewpoint from the central station man and from the manufacturer. And I simply want to repeat that what we all ought to do is to disseminate that information of the possibilities of profit to the central station in every way we possibly can, and if we keep on doing that we will find more and more, from year to year, that the central station man is with us. There isn't one of us but has felt the help that the central station people have given us in the last four or five years. The change has been remarkable, and if we look back over the period of ten or fifteen years we can take hope and courage from the situation as it is today and we don't need to be at all pessimistic about it. We are going ahead more rapidly every year than we have in the past, and it will not be long before we will have a product that will enable us to manufacture our goods cheaper, increase our wealth, and the central stations will in turn reap their benefit.

There is just one other point, and I say it as a suggestion not in any way critical. The manufacturer—and there are only twenty-five at the most—is called upon to help in every show, in every co-operative advertising scheme in this city and that city because that particular central station has waked up now and wants to do something. They are calling upon twenty-five manufacturers, as I say, at the most. Now those manufacturers, most of them, have too much capital invested in their business to be able to go to every city and make that particular city a strategic point of attack at the time. They can't do it. They can only back out and stay where they have good sales representation. The central-station man has got some ideas and that is all he has got. Therefore, it is up to the central-station man to see that his city is doing its duty. He can invest ten thousand dollars, if need be, in a garage. Somebody said we oughtn't to ask him to do that, but if they could show that the ten thousand dollar garage can in three years or two years make twenty or twenty-five per cent on the investment, he can afford to do that until somebody is ready to take that business over after he has built it up. It is necessary to have your garage in a city because we all know that the troubles of an electric vehicle come inside of the four walls of the garage rather than outside, and if you take care of the car at night and the batteries at night, you can send it out day after day and it always gives good service. It is the neglect inside the garage that gives the electric vehicle the black eye, not on the streets. They can't be hurt on the streets. So it is up to each central station man to take care of his own city and get the manufacturer to help him all he can, of course.

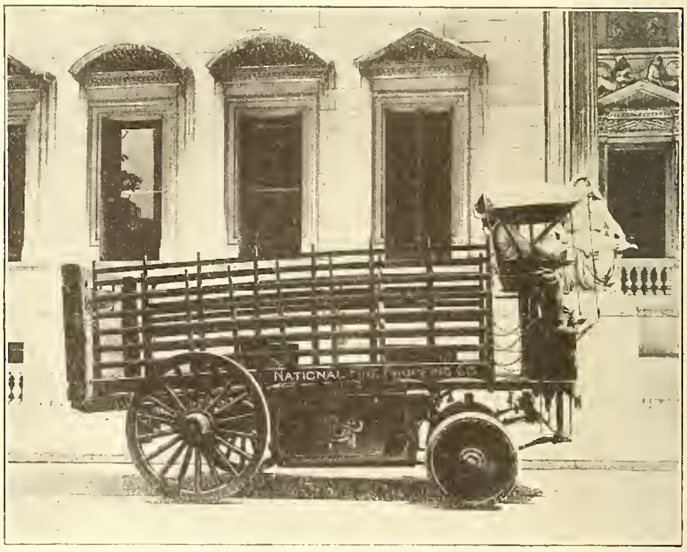
Mr. Callahan: I would like to say a word in closing. I am a booster; I am not a knocker, and I don't want anybody here to misunderstand me. The central station companies who are not backing this thing and pushing electric vehicles are asleep and they ought to be waked up. There has been a great deal of criticism. I want to make two points: One that the matter of electric rate does not cut much of a figure; and the other that in so many central stations it is against their policy, or for other reasons, because they have all they can take care of in selling current, to sell vehicles. We have worked a year or so to find someone with capital enough to start the sale and open up a business of garaging or selling vehicles. It has come back to the question of our doing it or its not being done at all.

As to the data in the handbook. We all realized a year ago, in the last two years that I was chairman of the committee on the handbook, that we needed data on the vehicle. We didn't know where to get it. I tell you frankly that we could have got a great deal of data from the manufacturers, but I felt that the people getting the handbooks would feel that it was really right to have it backed up by the Association and by the views of all the manufacturers and the experience of the central stations. You can readily realize that, and when I say that no data was offered I believe this is true. No data was offered that we really could put in the handbook and swear it was right, and we could not get data from central stations who had operated vehicles or the customers who had operated vehicles. I found that impossible with forty editors on the committee. I just came from an executive meeting in New York of the N. E. L. A. commercial section, and we want to make an earnest plea to you, as an association, to furnish and back the information up as correct, reliable information which we will put in the books, and it will be of great assistance.

New Baker Models

Ralph Temple, Chicago, announces four new models of Baker electrics which are ready for inspection and delivery. All four designs have comfortable revolving chair front seats with full view ahead for all occupants. Two styles are furnished with wheel steer and two with non-vibrating lever steer. Four brakes are operated by two foot levers. In these new cars the Baker presents an entirely new type of spring suspension and a new type of motor and non-arcing controller, for which is claimed a saving of twenty-five per cent of battery consumption in starting the car and getting up speed. Safety fuses are also affixed to the resistance coil to preserve the motor from over-heating or setting the car on fire.

The body designs are new and beautiful. The Temple company announces that as soon as it disposes of the used and rebuilt electrics it has on hand of various makes, it will deal in an exchange for Baker used electrics exclusively.



A Front Wheel Drive Couple-Gear Truck.

Baker's Chocolate Moved by G. V. Trucks

In our November issue, we inadvertently placed the wrong caption under the picture on page 249, as the four trucks shown were manufactured by the General Vehicle Company and not the Atlantic Vehicle Company.

Walter Baker & Co. bought their first G. V. truck in 1908, and it was placed in service early in 1909. Since then they have bought three 3½-ton G. V. trucks. The Baker plant is located in Dorchester, Mass., and a large proportion of the products of this internationally known manufacturer are brought into Boston on G. V. electrics. Thousands of bags of cocoa beans and sugar are also brought to the plant on the return trip.

G. M. C. Reports Sales

Manager Kilbourn of the General Motors Truck Chicago branch feels that the campaign for placing electric vehicles in the big stores in the loop district is bringing great results. Following a big business among small merchants, the placing of a one-ton electric delivery wagon with the Boston Store recently was particularly gratifying.

"National Highways" Versus "Federal Aid"

Most people use the term "National Roads" and "Federal Aid" synonymously, notwithstanding the fact that these two terms represent two entirely different ideas and systems in regard to highway improvement by the national government.

The National Highways Association and other advocates of national roads favor the construction of a system of trunk lines connecting the principal cities of the country, entirely at the expense of the government and under government control. These advocates believe that the states should build certain secondary roads entirely at the states' expense, and under state control; and that the counties should build a third class of roads entirely at the counties' expense and under the counties' control. This in a general way is the plan on which the French road system is based.

The advocates of "Federal Aid" for road building do not favor the construction of transcontinental trunk lines or highways at the government's expense; they believe that the government should appropriate money for road building and hand it over to the states for the states to spend on state roads.

Before it is possible to have an intelligent discussion of the road question, it is necessary to have a clear understanding of the meaning of the two terms;. they involve the basic principles of highway construction and administration.

An extract from an address by Hon. John H. Small, congressman from the First North Carolina district and a member of the Committee on Rivers and Harbors, is interesting because it illustrates one instance in which this confusion in the use of the two terms has been cleared up. The address was delivered at the recent convention of the North Carolina Good Roads Association at Morehead City, N. C., and led more or less directly to the action of the convention by which an amalgamation was effected and the North Carolina organization became the North Carolina division of the National Highways Association. Congressman Small said:

> I am impressed with the idea of the federal government and the states undertaking to build a systematized series of national highways, and the appointment of a commission to consider all the elements that enter into the problem of building highways. The idea is a revelation to me. My thought has all along been federal co-operation with the states, appropriating so much money to be expended in the states in co-operation or in conjunction with certain money appropriated by the states and the local communities. But this idea of the federal government itself building great national highways and interstate highways which shall bind us all together in stronger ties; stronger than they have perhaps ever been before; stronger possibly than our great interstate line of railroads; stronger than has been consummated by the telegraph and telephone of our admirable postal series,—this idea is new to me. I am in favor, I say, of the United States building a national system of highways; and there is nothing in the constitution, nothing in our theory of government which militates against this idea. But let us remember that this does not in the slightest degree minimize the necessity of states, counties and townships doing their share and having their system for the building of roads.

Field electric buses are the subject of a 24-page pamphlet recently issued by the Field Omnibus Company, Singer Building, N. Y. The booklet gives data in regard to the earnings, operation and maintenance of the Field bus, which is equipped with the Edison nickel-steel storage battery.

Another St. Louis Electric Garage

An announcement of importance was made by Milton B. Strauss to the effect that the Electric Garage and Service Company, a company recently formed to take the place of the present Webb Company, of St. Louis, Mo., agents for the Buffalo Electric pleasure and commercial cars, has absorbed the business of the Cook Motor Vehicle Company, located at Delmar and Clarendon avenues. The change took place Saturday, November 1.

"We will have an exclusive electric garage," says Mr. Strauss, who is general manager of the new company, "and not only will we give minute attention to Buffalo electric owners' cars, but electric cars of all makes will receive our personal attention. Our facilities for recharging batteries, washing and taking care of electrics is the best in St. Louis. Our location is such that any one garaging cars with us will have the advantage of having their car delivered to them in the shortest possible time.

"Service will be our big idea. We will continue to conduct a repair and painting department and as the enjoyment of every electric car is doubled by having that car under expert inspection of first-class service men, we expect to prove by our work that ours is superior electric service. We will continue to handle Buffalo electric, both pleasure and commercial cars, and if our sales continue to increase as rapidly in the future as they have in the past, there will be not only a great number of foot control electrics on the streets of St. Louis, but there will be also a large number of Buffalo trucks."

Dwight B. Blossom is president of the Electric Garage and Service Company. Both Mr. Strauss and Mr. Blossom will devote their attention to the interest of the new company. The entire building at the northeast corner of Delmar and Clarendon will be used with the exception of a small part of the showrooms at the southwest corner of the building.

Fine Imposed for Speeding

Among Chicago automobile enthusiasts, much discussion and comment has resulted from the arrest of J. S. Codman, vice-president of S. R. Bailey & Company, of Amesbury, Mass.

As Mr. Codman was driving his Bailey electric roadster up Michigan boulevard, in something of a hurry to reach the Illinois Athletic Club, an officer of the law detained the roadster and its driver with that familiar expression, "You're under arrest for speeding, and you will have to fix it up with the judge."

During the court proceedings, evidence was introduced by the officer in describing the car as one of those low, racing type cars.

The Stewart-Warner Speedometer corporation has established nine new direct factory branches located in Philadelphia, Pittsburgh, Atlanta, Portland, Los Angeles, Kansas City, Minneapolis, Cincinnati and St. Louis. In addition to seventeen direct branches, the company expects to install one hundred service stations in the smaller cities.

The new 50 Borland electric coupe is an extremely roomy car, having ample seating capacity for five adults. Two rather unique features in the standard equipment of this machine are a silk umbrella, which is placed in the car in a very inconspicuous position, and skid chains.

Garage Committee Report

To the Convention of the Electric Vehicle Association of America

THE garage committee of the E. V. A., as may be generally known, was appointed to investigate garage conditions and to atempt the arrangement of general local rates for the charging and care of electric vehicles throughout the country. Our aim, of course, is to aid electric garages in giving their customers the best service at the lowest cost and at least expense to the garage, so that the garage man may not only have satisfied customers but make money as well.

Our plan has been to appoint local committees to make investigations and recommendations and follow up the work in New York, Boston, Chicago, Indianapolis, Newark, Rochester, St. Louis, Philadelphia and Washington, D. C.

Below you will find the reports in detail from some of the local committees, all of which will speak for themselves and tend to show that the work of this committee, is, of necessity, slow moving, but that some desirable results have been already obtained—other committees simply reporting progress.

It was the desire of the committee that the manufacturers of vehicles and parts cooperate with the garage committee in offering public garages their repair parts at a discount which would permit the garage to sell the parts at the same prices the manufacturers' agents sell at, with a profit to the garage.

We have found, in many cases, that the manufacturers are unable to comply with this request, inasmuch as it would conflict with their agency agreements. This, of course, is disappointing, and, if possible, should be overcome in some way and provision made in the price schedules of repair parts for a profit to the garage men.

One hundred of the official garage signs adopted by the committee on rates and charging stations at the last annual meeting have been delivered to the garage committee and will very shortly be placed by the local representatives of the garage committee upon garages qualifying for recognition.

We would request that manufacturers instruct their sales representatives to recommend customers to official garages as soon as they are advised of the association's recognition.

Respectfully submitted, F. F. PHILLIPS, *Chairman;* F. F. SAMPSON, E. S. MANSFIELD, ERNEST LUNN, GEORGE H. WOOD, S. G. THOMPSON, W. S. BURCH, T. B. ENTZ, R. L. LLOYD, H. H. SMITH, JOHN J. BARTRAM, *Committee.*

REPORT OF THE NEWARK, N. J., GARAGE COMMITTEE.

I am pleased to report on the progress of the New Jersey section of the garage committee, Electric Vehicle Association of America, as follows:

NEW GARAGES.

Newark:
Electric Garage Co., 123 Washington street.
Equipment: 200 hp.; 150 kw.
Exclusive electric garage, 24-hour service.
Jersey City:
The Crescent Garage, 2565 Boulevard.
Equipment: 50-ampere synchronous converter.
Also garages gasoline machines.
Camden:
Exclusive electric vehicle garage soon to open; site not yet determined.
Equipment: 50 kw.

Respectfully submitted,
S. G. THOMPSON, *Chairman Newark Committee.*

REPORT OF THE BOSTON GARAGE COMMITTEE.

The Boston Sub-Committee was organized at a meeting held August 23, 1913, with the following members:

E. S. Mansfield, Edison Elec. Ill. Co., Chairman; A. E. Carpenter, Atlantic Vehicle Co.; J. S. Codman, S. R. Bailey & Co., Inc.; E. D. Dodge, Dodge Motor Vehicle Co., F. N. Phelps, Baker Motor Vehicle Co.; Nicholas Rommelfanger; D. C. Tiffany, D. C. Tiffany Co.; O. G. Draper, New Eng. Sec. E. V. A. of A., Secretary.

The membership of the committee represented central-station, passenger-car, truck and garage interests; the latter being in the majority.

At an early meeting, Mr. Codman presented resolutions and a scale of charges for the consideration of the committee. These served as a basis for the final recommendations, herewith attached.

After these had been liberally discussed, they were sent to 10 garages not represented on the committee, with a request for suggestions. One replied that the charge for dead storage was too low, another writing that the scale had been adopted and was thenceforth in effect in that garage. No other replies were received.

The committee experienced considerable difficulty in the attempt to solve the insurance problem, covering garage risks during deliveries, and it was finally decided that all deliveries should be made at the risk of the car's owner.

The attached resolutions adopted by the Sub-Committee are to be regarded as incorporated in this report.

Respectfully submitted, E. S. MANSFIELD, *Chairman.*

RESOLUTIONS.

As finally amended and adopted by the Boston Sub-Committee of the Garage Committee Electric Vehicle Association of America.

RESOLVED:

First: That it is highly desirable that the electric garages of New England should make charges for service as nearly uniform as possible.

Second: That the first step in this direction is to secure uniform charges from the large electric garages in Boston proper.

Third: That the items to be charged for in these Boston garages should be classified in accordance with the recommendations of the Garage Committee of the Electric Vehicle Association of America.

Fourth: That there shall be two distinct sets of charges; one for transients and one for cars by the month.

Fifth: That the scale of charges for *transients* shall be as follows:

Storage—50c for each 24 hours or fraction thereof.

Service Charges—7c per kwh., with a minimum of 75c. If left over night an additional charge of 25c.

Delivery Charge—25c to include one delivery of car or call for same at owner's risk.

Washing—$1.00.

Polishing and Dusting—50c.

Labor—75c an hour for skilled, with a minimum charge of one-half hour; 50c an hour for unskilled, with a minimum charge of one-half hour.

Repairs and Parts—At prevailing market prices.

Sixth: That the scale of charges for *monthly customers* shall be as follows:

Dead Storage for Passenger Cars—$6.00 per month.

Live Store to include: Washing, polishing (bright metal), cleaning, oiling, inspection (mechanical and battery), flushing batteries.

Runabouts, victorias and other open pleasure cars.......	$20
Coupes, broughams and other closed pleasure cars.......	25
Commercial cars—capacity, 700 to 2,000 pounds........	20
Commercial cars—capacity, 2,001 to 5,000 pounds........	25

Commercial cars—capacity, 5,001 to 8,000 pounds	30
Commercial cars—capacity, 10,000 pounds	35

Charge for Current—5c per kwh.

Delivery Charge—To include one call and delivery per day at owner's risk, $5 per month.

E. S. Mansfield, N. Rommelfanger, J. S. Codman.

REPORT OF THE NEW YORK GARAGE COMMITTEE.

In accordance with the plan laid out at the meeting of the Garage Committee of the Electric Vehicle Association, held at the office of the secretary, 124 West 42nd street, at 2 p. m., January 17, 1913, a local Garage Committee in New York City was organized, composed of the following:

F. F. Sampson, Exide Depot; R. R. Clayton, Atlantic Vehicle Co.; C. A. Ward, Ward Motor Vehicle Co.; S. C. Harris, New York Edison Co.; H. M. Martin, Piercy Contracting Co.; Nathaniel Platt, Baker Motor Vehicle Co.; S. W. Menefee, Anderson Electric Car Co.

A meeting of the above committee was held on April 1, 1913, to first secure the information requested as per letter of March 7, 1913. Copies of letters sent out, with the information secured are attached hereto.

The answers to the questions in the letter of March 7, 1913, are as follows:

Question 1. Number of electric passenger and commercial vehicles operated in New York City.

Question 2. Number of public garages: Commercial, 4; passenger, 10; combination, 2.

Question 3. Rates of storage, charges by the garages and what is included.

The above garages were addressed requesting them to give this information (see form letter attached Nos. 1, 2 and 3).

The rates on commercial cars are more nearly uniform than are the rates on pleasure cars. I believe that a safe general average of the commercial car rates would be about as follows:

750-lb. wagon	$40 lead battery	$ 50 Edison
1,000-lb. wagon	45 lead battery	55 Edison
2,000-lb. wagon	50 lead battery	55 Edison
3,000-lb. wagon	50 lead battery	75 Edison
2-ton wagon	55 lead battery	75 Edison
3-ton wagon	55 lead battery	85 Edison
3½-ton wagon	60 lead battery	100 Edison
5-ton wagon	60 lead battery	110 Edison

In most of the garages the following is included in their garage rate: Housing, washing, oiling and cleaning the vehicles, equalizing and charging the battery.

The pleasure car rates generally run from $35 per month for runabouts to $55 per month for landaulets or broughams. There seems to be no uniform rate on pleasure cars.

Question 4. Rates for calling for and delivering cars. In some cases the garages include this charge in their garage rate; in others the rate is so much per mile for delivery and still in others a certain charge per month, usually about $5.00.

Question 5. Rates for current to customers:

The rates for current to customers vary from 5 to 10 cents. The monthly garage rates are based on a current charge of about 5c per kw.

Brooklyn Edison Company rates are: 10c per kw. for the first 25 hours or fraction thereof, per month use of the maximum demand; 5c per kw. for the second 25 hours; 3c per kw. for all current furnished in excess of 50 hours per month use of the maximum demand.

When the portion of the bill which is figured at 3c per kwh. shall exceed $25. The discount on such portion shall be 5 per cent.

$50	10 per cent
$150	15 per cent
$200	20 per cent
$300	30 per cent
$400	40 per cent
$500	45 per cent
$1,000 and over	50 per cent

Intermediate discounts shall be determined by interpolation.

New York Edison Company rates are: First 2,500 kwh., 5c; second 2,500 kwh., 4c. All current in excess of the first 5,000 kwh. at 3c. Minimum charge of $25 per month.

The above covers the preliminary information suggested that the local Garage Committee obtain before starting its work.

Letters were also written to the battery manufacurers and users, as to what battery practice is recommended to follow in both regular and emergency charging. Practically all of the battery manufacturers replied by sending their regular instruction books.

A letter was also sent to the electric vehicle manufacturers, asking what maximum rate of charging the wiring now being placed on their vehicles is capable of carrying. Most of the manufacturers replied that the wiring was of such capacity that it would accommodate the high boosting rates.

The next important thing taken up by the committee was to determine the qualifications of a garage necessary to become an official Electric Vehicle Association garage and to fly the sign.

Letters were sent out to the garages, saying that the committee was ready to establish the official garages. Three of the garages have answered and are being inspected. It was decided that a blank be made out covering certain questions to be answered by the garage desiring to become an Electric Vehicle Association garage. Upon these questions being answered satisfactorily and the committee deciding favorably, the garage would be recognized and given a sign. Copy of the original letter sent to the garage is attached hereto (Letter No. 4), also blank showing the form of questions to be answered (Form No. 5).

The committee recommended that the Association make an appropriation of $35 to $40 per month to maintain an inspector of garages desiring to become members, and also whose duty it would be to keep in touch with the official garage, to see that they keep up the proper standard of service. Inasmuch as no action has been received on this, two of our committee—Mr. Clayton and Mr. Harris—are now inspecting garages that have applied for the garage sign, and we expect, in a very short time, to have a number of official garages and charging stations in this territory.

The garage sign was exhibited by the New York Edison Company at the Electrical Exposition and Motor Show.

Submitted by F. F. Sampson, *Chairman, New York Garage Committee.*

LETTER NO. 1—TO PUBLIC PASSENGER AND COMMERCIAL CAR GARAGES.

April 7th, 1913.

Gentlemen:

So that this office may be equipped to properly answer such inquiries, as from time to time come in, will you not kindly advise us what schedule of rates is in effect at your establishment?

What rate is quoted for full garage service? What is included in this service?

If you have an alternate proposition where charging current consumed by each car is measured and billed separately to the owner of the car, at what rate per kwh. is the current billed, and what rate do you place on the remaining garage services?

How and what do you charge for boosting?

Very truly yours,

...................., *Secretary.*

LETTER NO. 2—TO PUBLIC PASSENGER AND COMMERCIAL CAR GARAGES.

April 24th, 1913.

Gentlemen:

As you doubtless know, the purpose of our Association is to increase in every way possible the sale of electric vehicles throughout the country. One of our plans is to act in an advisory capacity to purchasers or prospective purchasers of electrics, supplying them freely with such information as they may wish.

We are very often asked about garage service, and although we have on hand, at the present moment, the schedules in effect by most of the public garages in New York City, it is entirely possible that prices have changed since this information was last obtained by us. We now wish to check up the figures in this office so that we may be equipped to accurately answer such inquiries as from time to time come in, and your answers to the questions listed below will be thoroughly appreciated and perhaps of service to us both:

What rate is quoted for full garage service and what is included in this service?

If you have an alternative proposition where charging current consumed by each car is measured and billed separately to the owner of the car, at what rate per kwh. is the current billed, and what flat rate do you place on the remaining garage services?

How, and what, do you charge for boosting?

Do you make special rates for delivering and calling for cars?

Trusting we may have your valued co-operation in this sales increasing campaign, and assuring you of our willingness to reciprocate in any way we can, we are, Very truly yours,

...................., *Secretary.*

LETTER NO. 3—TO PUBLIC PASSENGER AND COMMERCIAL CAR GARAGES.

Gentlemen:

As we have received no response to our letter of April 24th, we assume you have not had time to give it attention and we are repeating our questions in the hope that we may receive a prompt reply:

1. What rate is quoted for full garage service and what is included in this service?
2. If you have an alternative proposition where charging current consumed by each car is measured and billed separately to the owner of the car, at what rate per kwh. is the current billed and what flat rate do you place on the remaining garage services?
3. How and what do you charge for boosting?
4. Do you make special rates for delivering and calling for cars? We shall greatly appreciate your courtesy in giving us this information.

Very truly yours,

...................., *Secretary.*

LETTER NO. 4—ORIGINAL LETTER SENT TO GARAGES WITH COPY OF RETURN POSTAL CARD.

Gentlemen:

The progress and increased service of our Association has doubtless been as interesting to you as it has been gratifying to our officers and directors. We wish, however, to be of more value than we have been and our proposed new movement is one of very special interest to the garage man.

It is proposed that we establish a certified list of garage members of our Association, who will display a sign bearing the Association emblem, and indicating the garage to be official, with the endorsement of the Electric Vehicle Association of America behind it. This movement is, of course, strictly co-operative. While it will improve the business of the garage men, it will doubtless also increase sales if we can demonstrate to the prospective electric vehicle purchaser that satisfactory garage service is available.

To qualify for a place on our official list the garage is asked to become an associate member of our Association and to pay a nominal rental for the sign which we propose to supply.

If you will advise us of your interest we will very gladly arrange to have our representative call and answer in detail any question which may occur to you.

Very truly yours,

...................., Secretary.

LETTER NO. 4—RETURN CARD.

ELECTRIC VEHICLE ASSOCIATION OF AMERICA.

124 West 42nd Street, New York, N. Y.

I would like to ask a few questions about your Official Garage Proposition. Please have your representative call at

No. ....

on .... at ....

Date Time

Very truly yours,

....

Name.

FORM NO. 5—APPICATION FOR RECOGNITION AS AN ELECTRIC VEHICLE ASSOCIATION OF AMERICA OFFICIAL GARAGE AND FOR PERMISSION TO DISPLAY THE OFFICIAL GARAGE SIGN.

1. What is your maximum storage rate for vehicles of varying capacities, equipped with either lead plate or Edison batteries?
2. Check each of the following items included by you in garage service for which the above rates are charged: Washing, polishing (bright metal), cleaning, oiling, mechanical inspection, battery inspection, flushing batteries, current.
3. Will you charge for the repair and replacement of parts at manufacturers' costs to users if the manufacturers allow a discount to your garage so that you may make a fair profit?
4. (a) What is your charge for skilled labor per hour? (b) What is your charge for unskilled labor per hour? (c) What is your minimum charge?
5. (a) Do you make an extra charge for delivering and calling for cars? (b) If so, how much?
6. Is your garage equipped to render day and night service? (Service includes ability to handle charging, towing in, emergency and repair work.)
7. (a) What is the maximum charging rate you can furnish per battery? (b) What is the maximum and minimum number of cells per battery of both lead and Edison batteries that you can charge? (c) How many plugs have you and what is the capacity of each plug?
8. (a) Is your garage an electric only or a combination of electric and gasoline? (b) What is your insurance rate?
9. Will you allow an inspection of your premises by a representative of the Electric Vehicle Association of America upon his request at your garage office?
10. Is your garage operated in an impartial manner, no preference being shown to any makes of vehicles, batteries or accessories?
11. Are you a member of this Association?

In answering the above questions I signify my desire to have my garage officially appointed and if favorable action is taken, I agree to become a member of the Association (if not at present a member) and to display the official sign to be furnished by you at a rental of $15 per year, it being understood that my first year's dues are included in the above mentioned price of $15.

Name of Garage ....
Address ....
Proprietor or Manager.............................
Date ....

Reverse side of blank provides for following:

REMARKS.

Inspector.

Approved by ....

....
Electric Vehicle Association of America.

REPORT OF THE CHICAGO GARAGE COMMITTEE.

You are hereby advised that the personnel of the Chicago Garage Committee is as follows:

Ernest Lunn, Chairman, Walker Vehicle Co., 551 West 39th street, Chicago; **W. J. McDowell**, General Motors Co., 2241 South Wabash avenue, Chicago; **George H. Jones**, Commonwealth Edison Co., 120 West Adams street, Chicago; **C. B. Frayer**, Edison Storage Battery Co., 229 South Wabash avenue, Chicago; **D. C. Arlington**, Philadelphia Storage Battery Co., 516 The Rookery, Chicago; **T. Milton**, Electric Storage Battery Co., 613 Marquette building, Chicago; **W. L. Rudd**, W. L. Rudd Company, 112 East 47th street, Chicago; **Harry Salvat**, Fashion Garage, 740 East 50th street, Chicago.

There are approximately 3,000 electric passenger and 710 electric commercial vehicles in Chicago.

There are 14 exclusively electric passenger vehicle garages, one electric commercial truck garage and 45 combination gas and electric garages.

Storage charges for passenger vehicles are from $35 to $40 per month, including charging current, storage, washing, polishing and flushing battery.

Storage charges for commercial vehicles are from $45 per month up, including charging current, storage, washing, polishing and flushing battery.

Current rates to customers. Regular power schedule averages 6.7c per kwh. for vehicles in private garages.

Rates charged by lighting companies to garages. From 1.6 to 5c per kwh.

Garage charge for delivering passenger cars. $5.00 per month.

The committee has held several informal meetings at which a majority of the committee was present. The results of the work of the committee have been gratifying, in that there prevails, between the Electric Vehicle Association of America and the Garage Owners' Association in Chicago, a hearty feeling of co-operation. The work of the committee has been made relatively easy because of the feeling of confidence which exists between the various organizations and concerns interested in one way or another in the welfare of the electric vehicle business; particularly, garage owners, electric vehicle manufacturers, the Commonwealth Edison and the Cosmopolitan Electric companies.

The majority of the electric garages purchase current from the electric lighting companies, who, through their established automobile service departments, co-operate with the garage owners in their endeavor to establish high-class electric vehicle service for both commercial and pleasure vehicles.

The business of the public electric garage is rapidly increasing and the high-class service rendered by many of the garages is most gratifying.

The committee is assured by the officials of the Garage Owners' Association, as well as representatives of the lighting companies, that it is expected that the same cordial relationship will exist during the coming year that has existed during the past year.

Respectfully submitted, ERNEST LUNN, *Chairman.*

REPORT OF THE PHILADELPHIA GARAGE COMMITTEE.

The Philadelphia Garage Committee consists of the following:

R. L. LLOYD, Chairman, who has charge of the electric vehicle department of the Philadelphia Electric Co., Philadelphia; J. CRAWFORD BARTLETT, of the Woods Garage, and agent for the Walker Electric Vehicles; CARROLL A. HAINES, proprietor of the Park Garage and representative in this territory of the Baker Electric Vehicles; FREDERICK K. MEARS, proprietor of the Regent Garage (one of the largest in West Philadelphia); W. A. MANWARING, who has charge of the garage and of all electric vehicles owned by the Philadelphia Electric Co.; FREDERICK B. NEELY, who is associated with the Electric Storage Battery Co.

Two meetings of this committee were held, one on May 12, another on June 17. Copies of the minutes of each meeting are enclosed. There have been no meetings held during the vacation months.

In accordance with the resolutions adopted, two letters were prepared; one sent to public service companies within a radius of 50 miles of Philadelphia, and the other to the public garages in the city.

The first letter read as follows:

Gentlemen: One of the objects of the Electric Vehicle Association of America is to unify and harmonize as nearly as may be practical the methods and practice of handling electric vehicles the country over.

The National Garage Committee has appointed a local Garage Committee to facilitate this work. As a first step, efforts are being made to collect statistics.

At the last meeting of the Philadelphia Committee, a resolution was adopted directing the chairman to request information as to rates for current charged by public service companies, for use in charging electric vehicles.

We ask that you advise us in this matter under the heads, viz.: Rates to garage; rates to consumers; if possible, please send contract forms. Your prompt attention will oblige.

Yours truly,
Philadelphia Garage Committee.

This letter was sent on letter heads of the Electric Vehicle Association of America to 20 companies in this territory. Just four replies were received.

The other letter reads as follows:

DEAR SIR: The Electric Vehicle Association of America has, through its National Garage Committee, made several recommendations which we believe you would be glad to have called to your attention, the idea being to unify as nearly as may be practicable the methods and practice throughout this territory.

The hope is, in the near future, to have a chain of high-class electric garages in and between all large cities, which will have the advertisement and endorsement of the National Association.

Among the recommendations are:

To separate the charge for electric current from the charge for storage, both transient and permanent customers.

A standard maximum storage rate (exclusive of current) which shall include washing, polishing, cleaning, oiling, inspection (mechanical and battery), flushing and cleaning batteries.

Garage to be equipped to render service night and day, and be prepared to render towing service.

A minimum capacity of 40 amperes charging current.

The committee will work with garages in an advisory capacity upon request.

At a meeting of the Philadelphia Garage Committee (local committee of the national body) held May 13, 1913, the chairman was instructed to collect statistics of all cars and garages in the Philadelphia territory.

To that end we request that you send answers to the questions on accompanying sheet.

As you are probably aware, the Electric Vehicle Association of America is nearly three years old. The object of the association is to popularize and promote the use of electric vehicles. Its members are derived from every interest affecting this industry. The home office is in New York City and branches have been established in Boston and Chicago. There is a prospect of one being started in Philadelphia. Co-operation is the strength of all advancement. For the sake of your business we know you will co-operate, and, as a first step, we look for your immediate reply.

Yours for the cause,
Philadelphia Garage Committee.

This letter was also sent on letter sheets, headed the ELECTRIC VEHICLE ASSOCIATION OF AMERICA, to 15 garages, from six of whom we received replies. Attached is a sample of the sheet which accompanied the letter.

There have been considerable complaints in Philadelphia by the public garage men on account of the fact that the Philadelphia Electric Company is willing to sell current indiscriminately to either the user or the garage men at six cents per kilowatt-hour. Several of the larger garages were selling current at this rate, or even lower, to consumers, and the proprietors of the smaller garages claimed they could not get business when they charged 10 cents per kilowatt-hour, and they could not afford to sell it for less.

One of the results of the Philadelphia Electric Company complying with the request of the Automobile Association had thus resulted in discouraging the use of electric vehicles rather than in promoting it, as the public garage men pretty generally gave this subject a black eye. They have felt that they were discriminated against and put in a position of not being able to earn any money from electric vehicle charging.

To overcome this conditions, and this apathy on the part of the public garage men, the Philadelphia Electric Company has recently made a concession. They are now prepared to offer a 33 1/3 per cent commission to the public garage men for all current used for charging electric vehicles, providing they will agree not to charge the consumer over six cents per kilowatt-hour. Time will tell whether this additional concession will be any incentive to the public garage men.

Your committee has every hope of securing greater co-operation during the coming season.

To refer once more to the letter of Mr. Phillips, under date of the 17th of March, we will furnish the following information:

There are, in our territory, 165 passenger cars and 443 commercial cars.

There are 15 public garages, and any of them will care for passenger or commercial cars.

Storage rates vary from $15 up to $27.50, according to the size of car. The regular garage attendance is included in each case. In the central part of the city, there is an additional charge of $5.00 per month, where cars are to be called for and delivered.

The rate for current to customers is, pretty generally, six cents per kilowatt-hour for the first $25 worth and 5c per kilowatt-hour for any above it, each month.

The Philadelphia Electric Company will sell current to the garages for four cents per kilowatt-hour, or less, if the quantity is sufficient to warrant a lower rate.

Permit us to suggest, however, that this information is duplicating the information which is being gathered by Mr. Gilchrist's Committee on Rates and Charging Stations. As we discussed in our original meeting, it seems to me that the Board of Directors should differentiate between the work of the two committees, so as not to duplicate the labor, and so as not to bother electric companies with duplicate requests for information.

In our opinion, the greatest need among the public garages in this territory is able attendants, men fully competent to care for electric batteries and cars.

The Philadelphia Electric Company has recently employed an electric vehicle expert, whose sole duty will be to help and advise along these lines, not only public garages, but all the customers taking current from the company. This seems to be a long step in the right direction, and much better results are expected in the next 12 months than have been evidenced in the past.

Respectfully submitted, Philadelphia Garage Committee, By R. L. Lloyd, *Chairman.*

OFFICE OF
THE PHILADELPHIA GARAGE COMMITTEE
1000 Chestnut Street, Philadelphia, Pa.

How many cars are cared for in your garage?—Passenger......
Commercial ...
Permanent ....
Transient .....
What is the storage charge?—Passenger........................
Commercial ....
What is the charge for electric current per kwh?...............
What is the charge for electric current minimum?.............
What is the charge for calling and delivering cars?............
What is your charging apparatus?...........................
What is the maximum charging capacity, amperes and volts?..
Are you prepared for towing service?........................
Is garage open night and day?...............................
Skilled Unskilled
What is the labor charge per hour for repair work?...........
What is the minimum charge for repair work?................
Would you care to have the Garage Committee act for you in advisory capacity? ....
Would you be interested and attend monthly meetings, if a Philadelphia branch of the Electric Vehicle Association of America were inaugurated?.............................
Any remarks or suggestions?..................................
Signed ....
Address ....
Return to R. L. Lloyd, Chairman.

REPORT OF THE ROCHESTER GARAGE COMMITTEE.

No local committee appointed.

In reply to your letter of September 23, as to the garage conditions in our territory, I beg to report as follows:

1. There are 460 passenger cars and 130 commercial electric vehicles.

2. There are 13 electric garages, two of which handle commercial vehicles.

3. Storage charge for passenger vehicles:—

Closed cars	$35 per month
Open cars	30 " "

These prices include charging, washing, polishing, delivery, and minor adjustments.

Commercial Vehicles:—

5 -ton	$60 per month
3½-ton	55 " "
2 -ton	50 " "
1 -ton	40 " "
1000-lb.	35 " "
700-lb.	35 " "

Prices include charging, washing, polishing and minor adjustments.

Dead storage rate varies from $5.00 per month, with $1.00 per charge, to $10.00 per month, with necessary charging included.

4. Rates for current to customers is included in the above charges, as stated.

For transients, the price varies from $1.00 to $1.50 per charge.

No organization among the garages in the city has yet been effected.

Respectfully submitted, W. S. Burch, *Chairman.*

DISCUSSION.

Mr. Chapin (Memphis): There is one sentence in this regarding the endeavors on the part of your Garage Committee which touches home to us. For two years and a half we have been operating a public electric garage with all facilities as to battery repairs and renewals and vehicle repairs generally. We have no agency agreements with any manufacturer. In doing that we have been repeatedly against this particular question of discounts. When we first started two and one-half years ago there were only three electric vehicle agents in the city of Memphis, two of them quite active and one not. In the two years following this the number of pleasure cars increased by three hundred per cent, the number of commercial cars increased by seven hundred per cent, and the result is that a few of the manufacturers find that they are not in the field, and it looks good to them, and they come and establish car agencies, and as a result there are now a dozen agencies. In the past six months they have sold less than a car apiece; but one result that we have felt has been that since the establishment of those agencies, although they may not have sold a single car and have but one demonstrator and we are taking care of six or seven cars of that make, we have been denied the discount which is our only source of upkeep inasmuch as we have no agency agreements for car parts. We have been compelled to boost our price of repairing those particular cars and in that way have tended to discourage the repairing or else we have had to work at a loss. I would like to see this discussion end at this particular time by stating that these manufacturers should give members of this Association, when they are operating public garages without agency agreements, at least something in the discount line.

Mr. Street (Chicago): This is a matter that properly belongs to the manufacturers and not this Association. The only action I can see now that the Association could properly take would be to recommend to the manufacturers that they take action, and allow central station companies who are operating public garages and who are not agents a discount.

The President: Do you make that as a motion?

Mr. Street: I make that as a motion.

The President: I suppose the motion should include where they have agreements with local agents that effort be made to make a mutual arrangement between the local agent and the manufacturer so that the company's public garage may have a discount.

Mr. Street: Yes. They certainly are a benefit to the electric vehicle industry and I think as such are entitled to consideration.

The President: My thought there was this: that the manufacturers doubtless have agency agreements in different cities which might prevent that unless the agents themselves concur. If you were to include the agent in such instances in your motion, that is, that effort be made to secure a mutual arrangement between the manufacturer and any local agent holding a manufacturer's agency agreement in regard to discounts, whereby in the interest of the industry as a whole those discounts might be extended to purchases by garages conducted by utility operating corporations, the central station company and the public garage, I should think perhaps some good might result from such a motion and action on our part and at the same time we wouldn't be ignoring the agent who probably has contract rights.

MR. STREET: I will state it is the practice, I believe, of nearly all manufacturers to allow central station companies a discount on vehicles purchased. There is no reason in my mind why that could not be extended to parts. This discount is extended to the central station companies for the reason that they are co-operating with the vehicle manufacturers for the vehicle trade, and they are entitled to that consideration. Speaking for our own company we will be glad to afford them a discount on parts as well as on complete vehicles.

MR. CHAPIN: I might anticipate the objection on the part of the garages by saying that locally it wouldn't make any difference where this occurred, those agents are tickled to death to have us carry the burden, and in our particular instance there are hardly any agencies at all that even have a repair man on their pay roll. They offer no objection whatever to this discount feature; they are glad to have us take care of the cars, but they want somebody else to get the fee, so I don't believe there would be any objection.

THE PRESIDENT: I understand that Mr. Street has made the motion that the Association recommend this course. Is that the motion?

MR. STREET: Yes.

Which motion was duly seconded and upon being put by the president was declared carried.

Low Cost of Up-Keep

The increasing use of the electric machines is due largely to the realization by automobile buyers that a dollar saved is a dollar made, for in no other type of self-propelled vehicle is the saying better exemplified. The cost of maintaining electrics and the cost of operating them are items very strongly in their favor. The increasing cost of gasoline has had the effect of adding to the popularity of the battery-driven car.

Perhaps the increased production and sale of the electric automobiles during the year past is due as much to the increased battery capacity, refinement of the mechanical parts, and added luxury of the machines as to the objections raised against gasoline cars. The 1914 models are so far superior to the previous year's machines that an even greater impetus to the usage of electric vehicles may be looked for. The announcements of the various manufacturers indicate that they have interpreted the features desired by the public to be comfort and economical operating expense.

The best types of electric pleasure cars are represented by agencies in Chicago, and these now have the new models on display. Longer wheel base and roomier bodies are the features that first impress the visitor to the local salesrooms. The eye quickly takes in the combination of beauty, comfort and simplicity embodies in these electric cars. A closer inspection confirms the perspctive.

The man or woman who fears to buy a car because of his or her ignorance of mechanical things cannot by the remotest possibility entertain such a fear with regard to the latest electric machines. Every detail is simplicity itself. Trouble possibilities are reduced to the minimum. Added to this feature the electric provides another great advantage in its cleanliness. The operation of an electric does not mean soiled clothes or greasy gloves, which is incidentally another economy feature.

The simplicity and cleanliness of an electric, combined with its ease of operation, eliminate the expense of a chauffeur. The splendid facilities which exist for recharging the batteries eliminate the former criticism of the electric; that it was inconvenient because of the necessity of recharging at frequent intervals and the absence of conveniently located recharging stations. Almost every garage now has recharging arrangements, and the increased mileage of the present-day machines does not require that the owner of an electric must continually get his batteries charged.

The electric, while primarily the ideal town car, is no longer handicapped by the claim that it is restricted to city usage. None of the good electric cars now made have a mileage of less than fifty miles on one charge, while the majority are capable of making runs of from eighty-five to more than one hundred miles.

Another contention regarding electrics has long since been dissipated through the frequent demonstrations of the fact that electric machines have certain advantages over heavier types of cars in going over rough roads. The lightness of the electric and the splendid construction of the better grade of cars causes these machines to take up the strain occasioned by rough roads with less damaging effects than might be expected in heavy gasoline cars. There are few hill roads that cannot be negotiated by the electric, because of the higher power in the latest machines. For these reasons runs over country roads are as practicable with electric cars as with gasoline motors.

A prominent dealer in gasoline cars of a well-known make recently made the statement that there is no car built in America which can stand the strain to which motorists put their cars, in cross-country driving especially. High speed, sudden stopping or slowing down, and bad roads will soon loosen the weaker parts and cause the best made car to rattle, according to this dealer, who was discussing gasoline cars.

In the electric the very causes to which this weakness of motor cars was charged are reduced to a minimum. There can be no *excessive* speed in an electric. The speed is more uniform and moderate, causing less strain than would be the case with high speed. There is no heavy machinery and body on an electric to increase the strain on rough roads, the shock being more readily taken up by the more sensitive springs. For the same reasons there is a much more reduced tire expense.

Ohio Agency for Louisville

Headquarters for the Ohio Electric have been opened at 662 South Fourth avenue, Louisville, Ky., in the new Arcadia building, with Mr. G. Bader in charge.

Spacious display room is afforded at the front, with space in the rear for a service station. The office is on a balcony in the rear. Mr. Bader will endeavor to make his quarters among the most attractive in the city.

Mr. Bader is assisted by Mrs. Bader in talking about the Ohio electric, and he expects to find a good market in Louisville for his car. At present he has in his showroom only the Model M, seating five passengers and showing the double control of the Ohio. Within a short time Mr. Bader expects other models to arrive.

Twenty Bakers for Sacramento

One of the largest single contracts for electric vehicles ever closed in California has just been consummated by Norman Taylor, western representative of the Baker Electric Company, San Francisco. Taylor placed an agency for the Baker electric vehicles with Graham & Lomis, of Sacramento, with an order for 20 of the new type of these machines. When such an order is placed for electric vehicles it furnishes a good proof of the future sale of this type of car.

The Correct Charging of Lead Cells

Points to Consider in Promoting the Efficiency of the Battery

BY JAMES M. SKINNER

CORRECT changing of lead storage batteries may be summed up in one rule: "Get enough current into the battery and get it in with a minimum of gassing." There is no doubt that the general observance of this rule, particularly the latter part, would increase the average life of lead batteries 20 per cent or more, but this fact does not seem to be generally appreciated. Fig. 1 shows a case where the gain was about 30 per cent. The task of this paper will be to discuss briefly the dangers of undercharging and of overgassing, and to describe a practical charging method whereby these may be avoided and the battery life increased to a great extent.

> *Start the daily charge at a moderate rate, not over the normal six-hour discharge rate. When gassing commences lower the rate until it stops. Continue this lowering process at each ebullition of gas until about one-tenth the starting rate is reached. The charge may be stopped shortly after this. An ampere-hour meter will be useful. One hundred and five per cent of the discharge is usually sufficient for the charge, although sometimes 100 per cent is enough and sometimes 110 per cent is necessary. Once a week the low rate at which the charge is usually finished is continued until voltage and specific gravity have risen to maximum and remained there for a few hours.*

The lead vehicle battery consists of positive and negative plates, separators, sulphuric acid and hard rubber containing jars. The positive plates consist of supporting and current conducting grids, and active material in the form of red-brown lead peroxide. The negative plates consist of similar grids and a peculiar grayish amorphous form of metallic lead known as sponge lead. It may appear at first sight that it is a rather difficult problem to keep both of these elements in good condition with the same charging treatment, because, apparently, treatments which are beneficial to the positive are harmful to the negative, and vice versa. But a closer examination will prove that it is a perfectly simple and easy matter so to adjust conditions as to keep both positives and negatives in perfect condition.

A good deal of the charging which batteries receive is harmful, not because the wrong thing is done, but because it is done at the wrong time and in the wrong way. Overcharging and undercharging are good or they are bad, depending only upon when and how they are applied. The first essential toward the betterment of conditions is a thorough understanding of the effects of each, so that they may be used properly.

Let us first consider undercharging. Undercharging to a moderate extent is not detrimental to a battery, and if mixed with proper overcharging is highly beneficial. Details on this point will be given later. On the other hand persistent undercharging with too few overcharges will result in a great deal of trouble. It is very seldom that something can be got for nothing, and no battery will deliver more power than has been previously supplied to it. If the charges are unduly shortened the capacity will fall off and the battery will develop sulphated plates, the cost of current for remedying which will far exceed the saving on the charges which have curtailed.

Undercharging makes troubles which manifest themselves chiefly in the negative plates. When in good condition charged negative plates have a soft, velvety texture, easily indented by the finger nail. This appearance is characteristic of sponge lead. As the battery discharges the plates absorb sulphuric acid from the electrolyte, and part of the lead sponge changes to lead sulphate. Lead sulphate is hard. Consequently a discharged plate feels harder than a charged one. When the battery is recharged the acid comes out of the plates again and the material resumes its velvety texture. If an insufficient amount of current is supplied to the battery some of the hard lead sulphate is not changed back to sponge, but remains in the plate when the charge is stopped. If undercharging is persisted in an additional small amount of sulphate is left each day and the quantity at the end of several weeks or a month will be considerable.

The sulphate particles are very small when first formed. If allowed to remain in the plate they steadily grow larger, since the solubility of the lead sul-

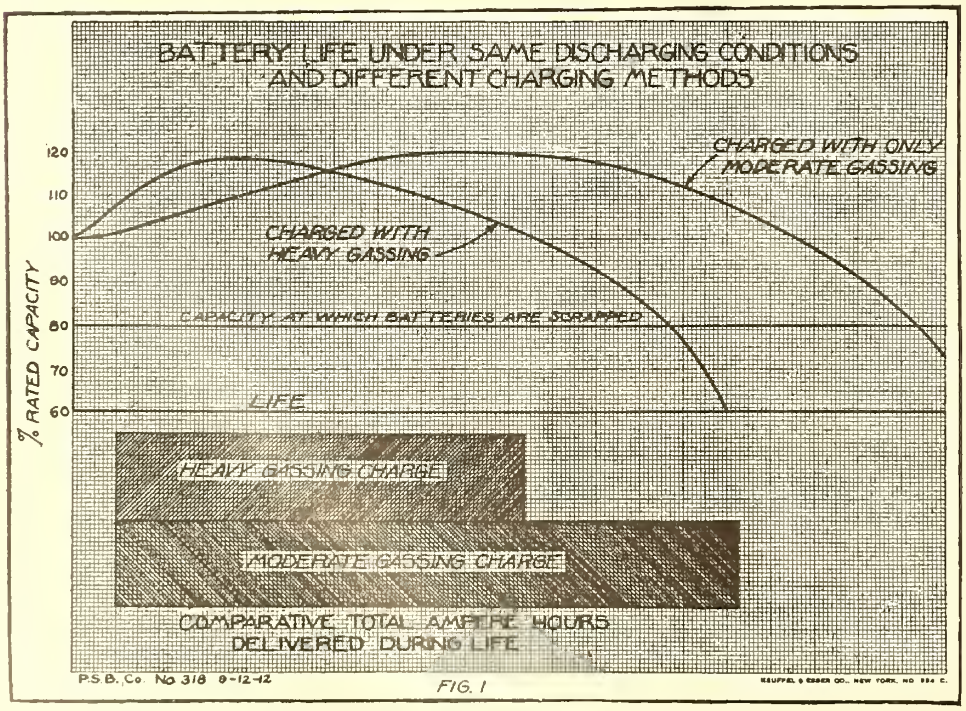


FIG. 1

phate in the acid is sufficient to permit of their slow, but continual solution and redeposition, during which process the smaller particle, whose solubility is greater because of their greater surface per unit weight, dissolve more quickly and redeposit on the slower dissolving, larger particles, causing these to continually increase in size. The larger the particles the harder it is to reduce them back to lead sponge. Sometimes they grow so large as to be entirely unreduceable except by special and time-consuming methods. As long as it remains in the plates this accumulation of lead sulphate subtracts just that much lead from the active material, and by clogging the pores with a nonconductor, adds just that much obstruction to the passage of the current to the material in good condition. Moreover, being possessed of little cohesion, it is likely to fall from the plate, and perhaps carry with it or loosen some good active material. It should be perfectly evident from this how undercharging, if persisted in, will do great harm to the negative plates.

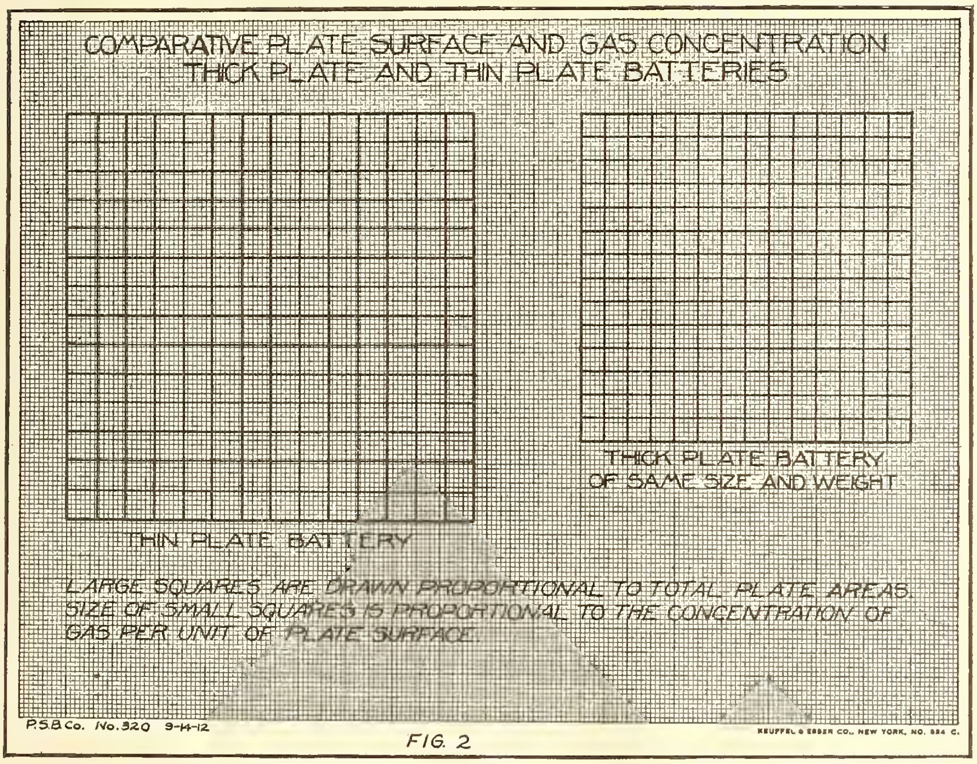

COMPARATIVE PLATE SURFACE AND GAS CONCENTRATION
THICK PLATE AND THIN PLATE BATTERIES
THICK PLATE BATTERY OF SAME SIZE AND WEIGHT
THIN PLATE BATTERY
LARGE SQUARES ARE DRAWN PROPORTIONAL TO TOTAL PLATE AREAS.
SIZE OF SMALL SQUARES IS PROPORTIONAL TO THE CONCENTRATION OF GAS PER UNIT OF PLATE SURFACE.
P.S.B.Co. No.320 9-14-12
KEUFFEL & ESSER CO., NEW YORK, NO. 384 C.

FIG. 2

There is sometimes a pressing need of a Society for the Prevention of Cruelty to Batteries, to intervene in behalf of batteries which are being starved to death. It seems, however, that troubles due to undercharging are on the wane. Battery owners are becoming more and more familiar with battery requirements and are disposed to supply current in far more generous proportions than formerly. Moreover the general change in the last few years from thick to thin plates has reduced the amount of charge current necessary. The old thick plate batteries with their smaller capacity are necessarily more completely discharged on a given run than the higher capacity thin plate batteries. The thick plates are very deeply sulphated, and the inner portions of this sulphate are not easily reached by the charging current. Either much current will be wasted in gassing or sulphate will be left in the depths of the plate after each charge. The evil effect of the latter condition on the negatives has already been discussed; the effect of the gassing on the positives will follow. Thin plate batteries are not as completely discharged, the sulphate is necessarily nearer the plate surfaces and easily accessible to the reducing action of the current, and due to the larger number of plates, there is about 50 per cent more plate area on which the current may act. Thin plate batteries therefore require less charging current.

Every battery needs some overcharging to keep it in good condition. But care must be taken how these overcharges are given. They are not in ordinary service needed every day, and they should not be carried out at a high current rate because of the gassing which accompanies them. Gassing is the greatest factor in wearing out a positive plate. Eliminate or reduce it and the life of the positives shows an incredible increase. As batteries are usually charged, gassing occurs, not only during overcharges, but at the end of ordinary charges. The passage of the charging current tends to decompose the electrolyte into hydrogen and oxygen. In fact these substances in the nascent form do travel toward the electrodes, hydrogen with the current toward the negatives, and oxygen in the opposite direction toward the positives. Lead sulphate has the property of absorbing them as they are driven against it. During the early stages of the charge there is an abundance of lead sulphate in the plates and the hydrogen and oxygen react with it in the following manner:

Positive Plate.

$$PbSO^4 + O + H^2O = H^2SO^4 + PbO^2$$

Negative Plate.

$$PbSO^4 + H^2 = H^2SO^4 + Pb$$

The amount of sulphate grows less and less as the charge continues. If the current rate is maintained at its original value, the same quantities of hydrogen and oxygen will be generated per minute, but with a decreasing amount of sulphate, it becomes more and more difficult for them to find material on which to act, until finally the rate of absorption falls below the rate of production. In this case some hydrogen and oxygen pass over into the gaseous form, and force their way through the active material into the electrolyte. The longer the charge continues the greater the proportion of the current used in generating gas. The hydrogen bubbling out through the negative plate pores is not particularly dangerous. It may dislodge or blister a little material, but sponge lead possesses a high degree of coherence, and is further protected by the flat face of the wood separator pressing against it. It requires pretty hard and continuous gassing to harm a negative by overcharging.

On the other hand the lead peroxide of the positives is not so blessed. It possesses comparatively little coherence of its own and heavy gassing is apt to destroy that put in by the battery manufacturer. The face of the active material is constantly washed off, falling to the bottom of the cells as mud, and the whole mass is opened up and softened. In very extreme cases the peroxide becomes of the consistency of mush, and of just about as much coherence. Thus the life of a positive plate is directly dependent upon the amount of gassing, and the importance of a systematic charging procedure which will minimize this can hardly be overestimated. The general adoption of thin plates has been a step in the right direction, because as previously mentioned they possess over 50 per cent more plate area than the thick plate batteries, and have therefore 50 per cent more surface over which the gas can escape. The plates are subjected therefore to only two-thirds of the thick plate gassing wear, as illustrated in Fig. 2.

As has been said, a battery contains two very dissimilar elements; positive plates, harmed by overcharging, and demanding a minimum of current for long life, and negative plates, suffering from an undercharge and requiring plenty of current for good service. As one of the large vehicle companies very aptly puts it, "the positives are injured by overfeeding and indigestion, while the negatives suffer from starvation and exhaustion." Evidently a combination of moderate undercharging on most charges, with a special care toward keeping the current below the gassing point at all times, and occasional overcharging at a very low current rate, so as to again minimize gassing, will meet the requirements of both. In actual practice the procedure has given remarkable results. Following is a more detailed account:

1. The ordinary daily charge is started at a moderately high current rate, not over the normal six-hour discharge rate, and the current is maintained at this point until, toward the end of the charge, gassing commences. The rate is then lowered below the gassing point, and the charge continued until the evolution of gas again commences. Here the rate is once more reduced. Tapering the current so as to keep it always below the gassing point is continued until a very low figure, about 1-10 of the normal six-hour discharge rate, is reached. At this point the charge is usually stopped, although there is no danger in continuing this low rate for a few hours more. After a very long and thorough discharge it may indeed be a good thing. An ampere-hour meter may be used to advantage in connection with this charging method, since a few experiments will determine points on the scale at which the current should be reduced to certain values. As to the total charge ampere-hours necessary, 105 per cent of the discharge will usually be sufficient, although this figure should be varied somewhat according to the character of the previous discharge. For a very short discharge it may be necessary to put back only 100 per cent of the ampere-hours taken out, for an ordinary discharge, 105 per cent is about right, while for a very long and thorough discharge 110 per cent may be necessary. Such details as this are easily worked out when a given set of conditions is at hand. If an ampere-hour meter is not in use, it is possible to determine the voltages at which gassing commences with various current rates, and to reduce the current to the next lower figure as the battery voltage rises to each of these predetermined points. Temperature and age of the battery have, of course a slight effect on these voltage figures. Better still, the battery may be watched, and the proper reductions of current made when gassing begins.

2. Once a week (usually over Sunday) the battery is given a regular charge as outlined above, and then the low rate current continued until the voltage and specific gravity readings have risen to a maximum, and have remained there for some hours. Detailed instructions on such overcharging are given in all battery instruction books.

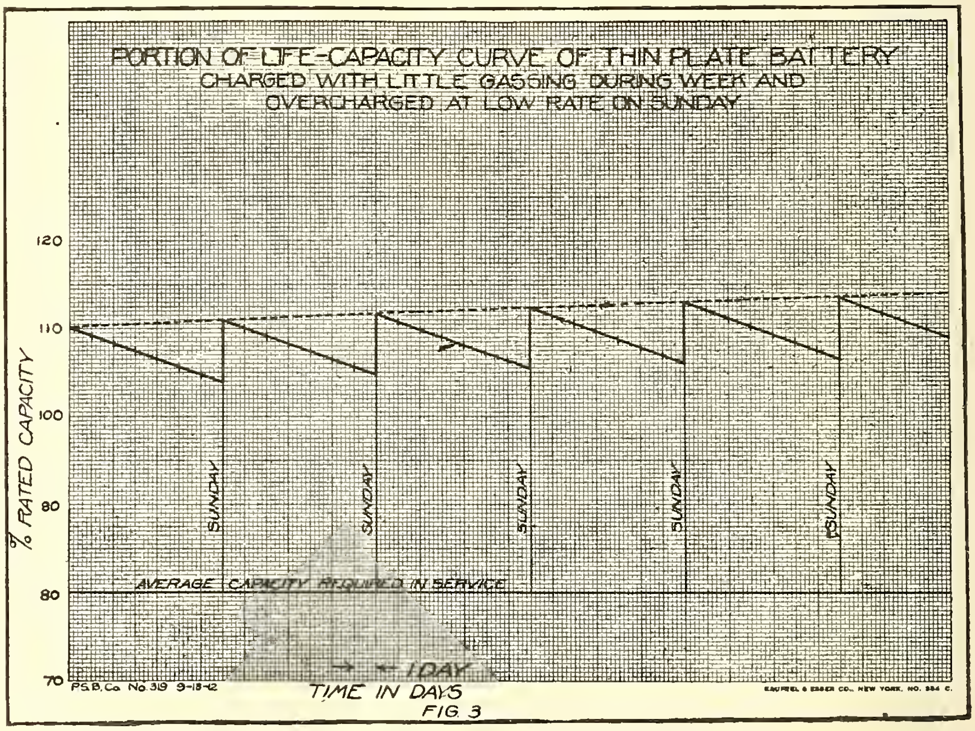


FIG. 3

A very essential part of the method, is the weekly overcharge, and it must not be omitted. The six-day undercharging leaves in the plates a very appreciable amount of sulphate, and this must be removed once a week. Two weeks' accumulation will be harder to remove than one week's, and that of a month may be very troublesome indeed. It is useless to carry out part one of the method unless part two is employed as well.

The capacity variation of a thin plate battery when charged in this manner is shown in Fig. 3. Each daily undercharge reduces the capacity somewhat, but it rises again to its full value immediately following the Sunday overcharge. It will be noted that ordinary service requires only about 80 per cent of the full battery capacity, and that at no times does the decrease, due to the undercharge, bring the capacity dangerously close to that required. In fact a rather wide margin is always left for bad weather and extraordinary trips.

From Rubber Tree to Tires

Some of the Processes Used in Finishing Raw Material

BY CHARLES C. HAVILL

THE Amazon Valley is prominent as a source of supply for the rubber industry. In fact, the greater part of the rubber consumed in the manufacture of automobile tires is received from Para, at the mouth of the river, and Manaos, a thousand miles up stream.

The country being too unhealthy for white people, the native Indians have the gathering of the rubber entirely in charge.

Scene on a Ceylon Plantation.

Attached to the trees, tapped by small incisions made with a hatchet, tin cups collect the "latex"—milk-white, and somewhat resembling cream.

At regular intervals the juice is emptied from the cups into large cans and carried into the curing house. The latex is poured over paddles or sticks and rotated in the smoke. As the juice sets, layer after layer is formed until the result is a solid ball or "biscut" weighing from 100 to 150 pounds. These biscuits are collected and transported to the shipping port, where they are graded and packed in large wooden boxes.

Building Slabs.

The gathering of the Ceylon products is similar in many respects to that carried out in Brazil, the difference in the finished product being caused by the curing process, which is effected in Ceylon by means of a solution of acetic acid, while the South American grower still relies on the smoking process, claimed to be superior in obtaining better results.

Ceylon rubber comes in thin, translucent sheets of lighter color than Para, and is practically ready for use, the impurities having been removed during the curing process.

The rubber on its arrival at the factory is inspected, weighed and stored in darkened cellars. Underground storage avoids deterioration under the action of light, heat or prolonged dryness. A dark, cool atmosphere offers the ideal storage condition in any stage.

Several processes of purification are required before the crude rubber is available for manufacturing purposes.

Applying the Tread.

Placed in vats of hot water, the biscuits are allowed to soften. The rubber is then passed to the breakers, which crush and masticate the lumps between large corrugated iron rollers. The product is then washed thoroughly and placed in a tank of hot water, where the rubber pieces are kept circulating by paddles.

In the sheet machine the lumps pass between rollers upon which water flows constantly. All grit and dirt are removed, while at the same time the rubber itself is rolled into thin, porous sheets, so that the greatest possible surface is exposed to the air in order to cause rapid drying.

As moisture has a deleterious effect on the manufactured rubber, the sheets are taken to the drying room and subjected to a slow drying to remove every particle of dampness.

After the rubber has become absolutely dry, the sheets are rolled until they have a soft and tacky consistency. Sulphur and other pigments are added, the ingredients thoroughly mixed by kneading.

After being milled, much of the rubber is taken directly to the various departments to be worked into different products.

The inner tube, the most vital part of the tire, is constructed by winding strips of Para rubber around an iron mandrel until built up to the required thickness. By careful rolling and pressing, each successive layer is made fast to the other, so that all seams and possible points of leakage are avoided. The tube is then wrapped with cloths and steam heated in an oven. By the use of compressed air the tubes are detached from the mandrel, the two tire ends buffed and spliced.

In the construction of the casing, the fabric is carefully inspected and run through the friction calender which impregnates it with rubber.

The fabric is fed from the front, and the rubber from the back. Held in place by friction, the rubber gradually slides through the rolls and is pressed completely through the meshes of the fabric. A thin sheet of fine rubber is applied by the coating calender which covers the entire surface. Before building a tire on a form, the fabric is cut into bias strips, so that the threads will run at a tangent and be on the line of strain in driving or braking the wheel.

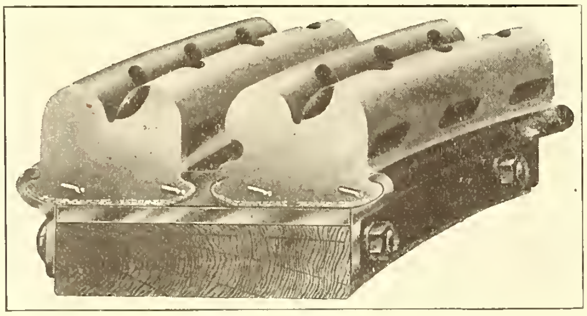
The treads are built up to the required thickness and made ready to apply to the body of the tire.

The actual assembling of the tire is accomplished by carefully and uniformly building on an iron core or form the coated fabric straps until the thickness required for the tire body is obtained. Each layer is made friction tight by careful rolling. The last layer, made of a tough rubber compound, forms the tread, which is constructed to withstand road wear.

In securing a perfect tread, the utmost exactness is required to avoid over-cure, which makes the tire brittle, and under-cure, which leaves it soft. The rubber and fabric are placed in a mold and subjected to uniform heat and tremendous pressure. At the proper time the tire is withdrawn from the heater, passed to the trimming room, where the marks of the mold are removed. To prevent sticking of the inner tube, a coat of asbestos is applied to the inside. In making electric vehicle tires, the rubber compound must be the purest obtainable in order to secure the greatest possible resiliency.

Cushion Truck Tire a Success

After considerable experimenting a cushion truck has been produced that is specially designed to meet the adverse conditions under which motor trucks are used and one that satisfactorily fulfills every requirement. The Motz Tire and Rubber Company originally directed its efforts toward the perfection of a tire for electric pleasure vehicles. The pronounced success of this tire caused truck manufacturers to insist on a tire with the same design for motor trucks.



Motz Truck Tire.

Detroit Will Exhibit at Dallas Fair

Detroit electric coupes may be shipped by express from the factory at Detroit in order to reach Texas in time for the Dallas Fair auto exhibit. Buford Adams, secretary-treasurer of the Detroit Electric and Motor Car Company, received a letter to this effect from G. D. Fairgrieve, assistant manager of the Anderson Electric Car Company, Detroit manufacturers. The consignment is being rushed to completion but probably will not be ready in time for shipment by freight. The Detroit exhibit at the Dallas Fair will consist of three coupes and three Wilcox electric trucks. It will occupy a 750-foot space at the exhibition building.

Selling Electric Passenger Cars

"'Cars is cars,' as Ellis Butler Parker would say, yet this deduction would be very inconsistent if we were to take into consideration the selling of the cars," says Arthur Stanley Zell of the Zell Motorcar Company, local distributers for Rauch & Lang electrics, at Baltimore, Md.

"The preparatory work for the sale is the same, but in the small items they differ radically; one is sold on beauty and a social necessity, while the main features of the other are strength and power. True, the electric must possess strength and power, in addition to beauty and its ability to care for the transportation wants of the woman of society, yet these points are seldom, if ever, presented as a part of an electric cars sale argument.

"It isn't a question of the horse-power rating, nor how fast it will go, but is there sufficient room to care for the persons to be carried; do the lines please? The woman takes for granted that the electric car possesses all the meritorious points necessary to make it the vehicle she desires, and, because of that, does not enter into conversation regarding the mechanical qualities that should be there. In selling a gas car the salesman must enter into a mechanical discussion regarding the relative merits of his car over that of his competitors. It resolves itself into a question of size of bore, stroke, horse-power, miles per gallon of gasoline, method of gear shift, electric starting arrangement in addition to quality of steel, analysis and tensile strength of the same, the oiling system, etc.

"While the woman must be appealed to in the selling of a car, she nevertheless does not always make the best sales person in selling electric cars. There are quite a number of requisites necessary to make the electric vehicle salesman successful. Many electric car concerns are engaging young college men, whose contact with society and whose education makes their entree easier into the circles of that class of people which purchase electrics.

"The qualities necessary for the electric salesman are, naturally, a good business head, good address, good appearance and social position among that class of people who purchase cars. With these qualifications the salesmen may secure an order far more easily than possessing the requisite necessary in selling gas cars. In the latter a fairly good knowledge of the mechanical details of the car and the ability to talk business convincingly are the only essentials necessary to secure a hearing from the prospective gas car purchaser.

"As the woman is such a great factor in the electric vehicle business, the electric car salesman who possesses the above qualities has easy sailing. The average woman is sufficiently loyal to try to assist the salesman in selling, provided she is satisfied with her own purchase. The clever salesman can secure unusual results because of the influence brought to bear upon the prospect by the satisfied woman customer."

On and after October 15 no heavy duty motor vehicles with steel tires shall be operated within the city limits, is the order which has been issued by the prefect of police in Paris, France. In addition, 7.5 miles an hour has been fixed as the speed limit of all commercial motor vehicles.

Electric a Factor in Cost of Living

There is no longer any doubt as to the economy of electrically driven vehicles both in commercial and social uses. On the farm, for example, there are now 22,667,941 horses and 4,357,480 mules now in service in this country. The bulk of these are in rural and outlying districts. When the work now performed by horses and mules is done by electricity there will be many more millions of bushels of corn, oats, and other grains left to feed human beings. This change will undoubtedly result in the cheapening of food for the city consumer.

Gasoline truck manufactures, who read the handwriting on the wall, are adding electric cars to their output. Gradually fire horses are being replaced by electric fire apparatus. By removing the front wheels of horse-drawn fire engines and substituting storage battery tractors a speedy motor vehicle is obtained, saving the dollars that would necessarily be spent in discarding the old equipment and providing new automobile engines.

It is estimated that in the year 1918 there should be in operation throughout the United States three hundred thousand commercial motor vehicles. By reason of their adaptability for city usage, electric vehicles should constitute sixty-five per cent of this total, or one hundred and ninety-five thousand machines.

Mileage on Single Charge

Two instances of long mileages on a single charge made by St. Louis owned Woods electrics are cited by Ralph R. Doak, local manager of the Woods Electric Vehicle Company, of St. Louis, Mo. On October 1, Mrs. Rassieur, wife of Judge Leo S. Rassieur, drove into the Woods garage, her odometer showing a mileage of 84 since the previous charge of the electric's batteries on September 23. This mileage was made on St. Louis streets, including all the grades encountered from the Rassieur residence at 3644 Castleman avenue.

On October 7, Miss Pockles, daughter of Herman Pockles, president of the Pockles Drug, Glass & Paint Company, drove the family electric into the Woods garage. The machine had been charged previously October 2 and had in the interim traveled 83 miles.

A New Motz Agency

The Hall Rubber Company, 1402 Ridge avenue, Philadelphia, Pa., has taken the agency for Motz tires. These tires are especially adapted for pleasure cars and light delivery wagons and trucks. They are punctureless, and, being made of the very best materials by the highest class of skilled mechanics, they have won a splendid reputation for endurance and long-wearing service. L. S. Hall, head of the Hall Rubber Company, is a veteran in the tire trade, which he knows thoroughly from every angle.

The Hall Company will handle Motz tires in eastern Pennsylvania, Maryland and Delaware. Mr. Hall is developing a high-class service department to take care of Motz users everywhere in that territory, and to this end he has secured the services of W. M. Stubbs, formerly manager of the Motz Tire Company's Philadelphia branch.

New Additions for Rauch and Lang

The new Rauch & Lang addition which that company is erecting on West 26th street, Cleveland, is nearing completion. The building consists of four floors, which will give an additional 78,000 square feet of space for the manufacture of Rauch & Lang pleasure cars. It will also contain the employes' entrance and what will be without question one of the finest final inspection departments found in any shop in the country. It is so arranged that daylight will reach the cars from three different points, namely, top and two sides. This arrangement will assist in turning over more perfect cars to customers than has been the case in the past.

Electric for Funeral Hearse

An electric funeral car has been added to the limousine equipment of Brown & Kilstrom Company, funeral directors, Grand Rapids, Mich. The car, an Argo electric, was designed by A. C. Chapman, manager of the Michigan Hearse and Carriage Company.

Electric Funeral Hearse in the Service of Brown and Kilstrom, Grand Rapids, Mich.

Care was taken in the designing of the car to avoid the lines of the old horse-drawn hearse. The roof of the car has a French sweep, and the sides are of beveled plate glass with leaded upper section. They are curtained in gray. The former appearance of the old-style hearse gives away to dignity and beauty in the new car. The company's ten seven-passenger electric limousines, together with the new hearse can make a cortege that is claimed to be unsurpassed.

New Lines For Woods' Model

A few of the new model Woods' electric cars are now finished. Mr. Goodwin, sales manager of the Woods Company, says these new models are lower and that they have a straighter roof line. They are distinctive by reason of their frameless windows. A new feature is the ampere hour-meter. This is a clock-like device, which shows at all times how much electricity is left in the battery.

Electric Gaining Steadily

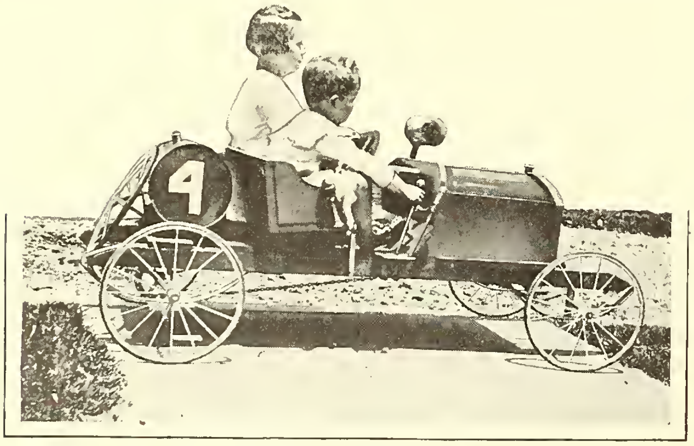
The relative standing of the two motive powers—electric and gasoline—is very sure to be affected in the vehicle, has been a close competitor of the gasoline car, near future by the jump of fuel prices. For some time past, the electric automobile, especially the commercial and the improvements in batteries and car mechanism is

The Economy of the Electric

"In the long run the electric car is far more economical than the gasoline car," states H. L. Goodwin, sales manager of the Woods Electric Car Company, of Chicago, Ill. "The man using a big gas car for city use pays for a great deal of power and speed that he does not need. Then there is only one moving part in the driving mechanism of the electric and the car owner does not have to make a repair shop out of his garage."

Joy Rides for Youngsters

There is nothing pleases the child quite so much as having something "just like father's." In this instance, says *Popular Electricity,* the small car shown was constructed especially for Master Tom Hoyt, son of the well-known consulting engineer of Cleveland. The little car is complete to the last detail, is driven by a small electric motor with clutch and two brakes and has a dummy shift lever. The driver of the car will never be molested for exceeding the speed limit of most cities, as the greatest speed to be obtained is but six miles per hour. It has been considered the most practical and complete little car ever constructed.



Master Tom Hoyt of Cleveland in His Miniature Electric.

Hires Models to Pose

"It required eight wardrobe trunks to hold all the smart and striking gowns used by the professional models the Ohio Electric brought from New York to pose for photographs illustrating this winter's advertising in all the large magazines," said D. B. Rose, agent for the Ohio, at Pasadena, Cal. "The expert photographers, who were also brought to Toledo, worked an entire week taking different views of the cars and lady models, in order that the artists might have unlimited material for Ohio advertising this winter. The Ohio factory feels well paid for the trouble and expense, as their advertisements are creating a great deal of comment on the beautiful way they are featured, being entirely different from the ordinary type of automobile advertisements."

The Electric Vehicle Hand-Book

The Electric Vehicle Hand-Book, by Cushing and Smith, presents very clearly the fundamental principles in the operation, care and maintenance of electric vehicles, their batteries, motors, controllers and accessories. Containing many explanatory illustrations, well-written descriptions and accurate data tabulations compiled by prominent authorities on the subject, the handbook is the first comprehensive treatise ever published on electric vehicles and should find a large market among vehicle users, garages, and especially among central stations.

The hand-book, pocket size and bound in flexible leather covers, contains 356 pages of discussion. H. C. Cushing, Jr., 53 Park Row, New York, N. Y., publishes and has the volumes for sale at two dollars.

Electric Truck and Crane at Brooklyn

The Bush Terminal Company, of Brooklyn, N. Y., has recently purchased a new type of combination truck and hoisting crane. The new device is proving satisfactory in every way, being economical in every respect. The apparatus consists of a regular truck chassis on the front of which is attached the ordinary type of swinging crane. The operations of the crane are simple; the truck is placed in position and held stationary by applying the brakes, then the crane is raised by means of energy supplied from a storage battery in the back of the truck, which operates both the crane and the truck. The crane picks up the material from its original resting place and deposits it in any position within the range of the crane. In the movement of smaller objects the crane lifts them and they are carried by the vehicle to the place intended for deposit. The truck is also used as a locomotive to which flat cars are coupled and on which it has placed its own load. This method is used only in long freight hauls. An accurate record of the actual cost and maintenance of this truck has been kept, and has been found a little less than $25 per week, including every thing in the operating of the truck.

Electric Vehicle Used As Advertising Medium

The Meridian Light & Railway Company of Mississippi has placed in its construction and maintenance service a number of 1,000-pound electric trucks.

Mr. Knight of that company originated an idea of placing, on both sides of the truck, signs advertising the electric vehicle, and connected to the battery in such a way as to be controlled by the driver. Much favorable discussion has been a result of the experiment.

The only disadvantage of the arrangement exists in the fact that the signs demand too much power from the batteries and consequently lessen the operating ability of the vehicle. However, this condition will be overcome by using a sign that has fewer lights and of less candlepower.

At the present time the sign is switched on only while the car is coasting or is standing still.

Manufacturers Attend Banquet

Thirty manufacturers of electric vehicles from all parts of the United States were entertained by officials of the Electric Storage Battery Company of Philadelphia at a banquet and cabaret at the Ritz-Carleton December 1.

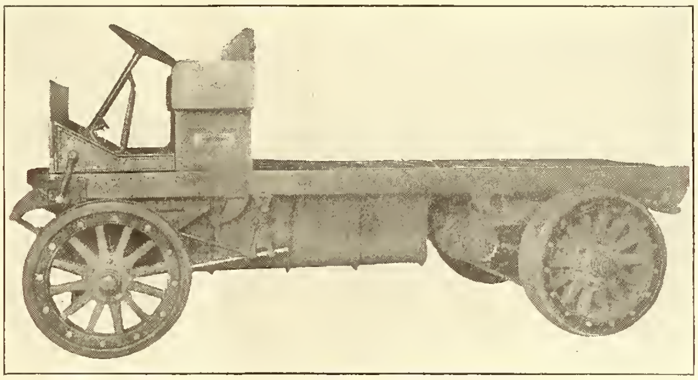
During the afternoon the visiting manufacturers were conducted through the plant of the Electric Storage Battery Company, and were entertained at the home of Herbert Lloyd, president of the company, at Bryn Mawr. Convention sessions of the sales managers of the company began at the Bellevue-Stratford December 2. A banquet at the Manheim Cricket Club concluded the convention.

A Multi-Battery Truck System

Some Features of the Klingelsmith Method of Interchanging Batteries

BY FRED B. SCHAFER

DURING the history of the electric vehicle industry, no one familiar with the electric truck has ever lost confidence in the permanent success of this type of vehicle. Its handicaps, however, were many from the start. Excessive weight of the battery in proportion to the mileage obtained, inaccessible and defective battery installations and defects in mechanical and electrical construction were more or less prevalent in the early days. Storage batteries twenty years ago averaged approximately 6½ watts to the pound. However, in more recent years, wattage as high as 13 in lead batteries and 15 in nickel and iron batteries per pound has been secured. Even under these conditions, tremendous improvements in the construction of batteries, motors, controllers, electrical and mechanical features of both the truck and passenger car have created a strong and increasing market for the electric vehicle, not only because of its simplicity, but because it can be easily operated, controlled as to speed, and, finally, because of its long life and exceedingly low cost of maintenance. Notwithstanding these improvements, electric trucks have been more or less subjected to criticism on account of battery troubles and the limited mileage obtained from a single battery charge even under the most favorable conditions. Poor road conditions, heavy work, grades, long trips, battery troubles, cost of maintenance and rapid depreciation of the battery, are problems, and have always been problems around which have centered more or less discussion, endeavoring to bring about a final solution.

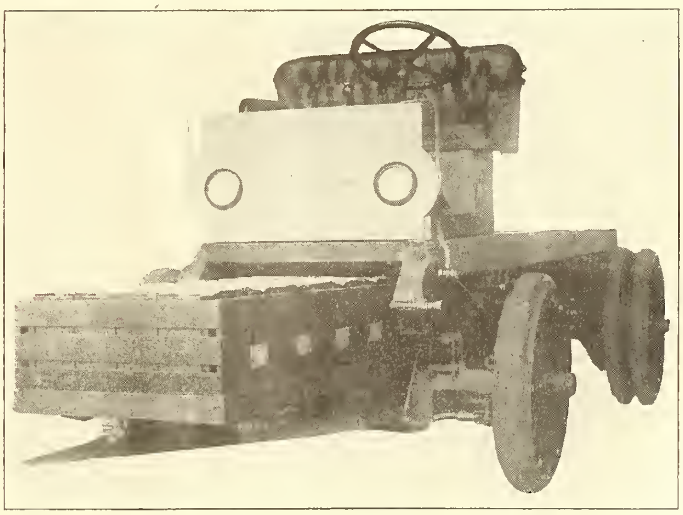


Klingelsmith Truck Assembled.

Manufacturers have devoted unlimited time and technical study to the perfection of a product which would solve these problems, these last obstacles to the ultimate success of the battery-propelled vehicle. In later years, the vehicle has practically attained its highest developments in mechanical construction, yet truck builders have devoted little attention to battery arrangement.

In view of improving the present service, the Klingelsmith Electric Truck Company of Chicago has designed and is placing on the market a truck which it believes is a great improvement over the present battery arrangement. In the Klingelsmith truck the battery, for its protection, is housed in a strong compartment, from which it can be easily removed when discharged, and replaced by a charged battery in less than one minute, by virtue of a small battery wagon, on which it is securely assembled and mounted. A small battery discharged, for instance, can be replaced by a large one already charged, in order to make a long trip, and a large battery can be replaced by a small one for a short trip. By this process dead weight is eliminated, cost of maintenance is materially reduced, and the truck can be kept in constant use and service under the most unfavorable conditions, regardless of mileage and road conditions.

No delay is necessary in removing a discharged battery and replacing it with one already charged. To illustrate: The battery referred to in the new system is permanently assembled on a small battery wagon mounted on wheels, so constructed as to run on a small T-rail track fastened to the bottom of the battery compartment, with a door dropping down over the front axle of the truck. This door has a track on the top side and when lowered forms a bridge so that when the door of the compartment is opened, the battery wagon can be run in or out of its compartment. When the battery wagon is run into the compartment, it not only automatically locks itself securely at once, but also automatically makes all electric connections between the battery and the controller. When the battery wagon is run out of its compartment, the automatic lock is released by a small lever, the door of the compartment is opened, and the battery wagon is run out on a platform over the front axle. The accompanying illustrations show, in a measure, the construction and method of operation of the battery wagon, which is standardized, so that batteries of different capacities and speeds can be easily interchanged in trucks of various load capacities. Long-trip batteries, short-trip batteries and batteries for fast or slow trips may be permanently assembled in the battery wagon, which in many cases is of great value.



Klingelsmith Truck Showing Battery Arrangement.

Aside from the practically unlimited mileage feature of this multi-battery system, the improvements in battery conditions, cost of maintenance and efficiency must be taken into account. Instead of charging the batteries while in the trucks, under the new system they are charged in the battery wagon out in the open, where the battery can be easily flushed, cleaned, examined and inspected, without loss of time and without the least difficulty. As the operator has twenty-four hours of charging time in each day, the battery can be charged at a very low rate of current. This system, it is claimed, will not only double the life of the battery, but increase its efficiency to a great extent.

Another advantage is that the battery can be regulated as to trips and mileage, and need not be discharged to zero, again increasing the efficiency and life of the battery. Under this system, instead of equipping an electric truck with an unnecessarily large and heavy battery in order to secure a certain mileage per day, in one battery wagon a smaller or lighter battery is assembled; in another, a larger or heavier battery, to meet any and all conditions and contingencies that may arise as to mileage, load and road, with facilities, however, for changing the batteries during the day as often as may be necessary to make the required trip or trips. If necessary, the service of a battery for every trip and every load can be had, including at least two speeds, if desired.

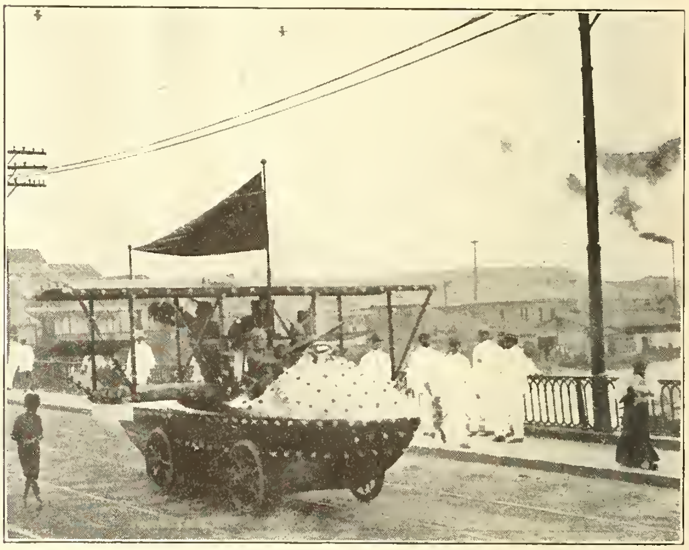
The controller is located within a few inches of the battery terminals and the motor, eliminating by this method all long wire and cable connections, and reducing current loss to a minimum. Operated by a foot pedal extending through a strong shaft with gear connections, it is thoroughly insulated and tightly enclosed in a compartment and readily accessible. The brakes are also operated with a line shaft connected with the brake beams, the service brake being operated with a foot pedal and the emergency brake with a right-hand lever. Two motors are used, both hung from a substantial shaft directly connected by a short shaft to a worm drive, hung as a unit with its motor. The worm wheel is connected by a short shaft to the sprocket, from which the chain connects with the sprocket on the rear wheels of the truck. The truck has no differential or countershaft. This is an expensive drive, but the cost is amply justified on account of the large frictional area and the high ratio and great flexibility and efficiency and long life of the drive.

New Battery Factory Almost Completed

The immense plant of the Edison Storage Battery Company at Orange, N. J., is practically completed and only awaits the installation of machinery to start making Mr. Edison's alkaline, nickel-iron storage battery on the enlarged basis made necessary by the rapid development of storage battery applications in electric trucks and pleasure cars. The laying off of something over 100 employes pending the arrival of new machinery and supplies caused a rumor that a new battery was to be forthcoming and that manufacture would be curtailed until its development. R. A. Bachman, vice-president and general manager, has flatly denied this rumor, stating that the Edison battery is practically the same that Mr. Edison perfected about five years ago and which has been largely responsible for the increase in storage battery transportation. Lord & Taylor have recently purchased a fleet of electric delivery wagons for their new store, and following the example of such concerns as R. H. Macy & Co., Hearn's, Loeser's, Abraham & Strauss, and Adams Express Company, have standardized on Edison batteries. This is the best of evidence that the present type of battery is not likely to be changed and by the latter part of December it is expected that all new machinery will be received, the present machinery rearranged to more efficient positions in the enlarged plant and an addition of over 200 new employes required.

Electric Floats In Manila

The photograph represents a hydroplane entered by the Union Truck Company, which won the first prize in the carnival parade held in Manila, P. I. The plane was built on a chassis of a 1,000-pound electric delivery wagon. The propellor was operated by a separate motor located just back of the driver's head; the elevating planes and rudder being operated by hand. The crew consisted of three men in red devil costumes (which was the official emblem of the carnival); the chauffeur, one man to operate a compressed-air gun, shooting confetti in cartridges, and one to operate the planes.



First Prize Winner at the Manila Carnival Parade.

Before the opening of the carnival this car, accompanied by a band, paraded through the streets at night, arousing the carnival spirit. As will be seen from the picture, the float was studded with 350 electric lights which gave it an even more pleasing appearance by night than by day. The body was painted red, trimmed with yellow and green, the carnival colors. The entire electrical effect was received from the battery used in propelling the vehicle.

Central Station Adopts Electrics

The Waverly Company of Indianapolis, Indiana, has made a shipment of six light shaft driven electrics to the New York Edison Company, for use in the metropolis.

Other recent purchases of the same type of Waverly truck have been made by the Edison Electric Illuminating Company of Boston; the Cambridge Electric Light Company; the Commonwealth Edison Company of Chicago; the Denver Gas & Electric Company; the Louisville Lighting Company; the British Columbia Electric Railway Company of Vancouver, B. C.; the Merchants' Heat & Light Company of Indianapolis; the County Light Company of Pittsburg, and the Duquesne Light Company of Pittsburg.

As a matter of fact, central stations all over the country are equipping themselves with electric trucks for use in the service of their customers.

A Folder For Layman

The Woods Company seems to have solved what has always been a difficult problem—that of putting the technical points of mechanical parts of the Woods electric in such form that they are interesting and easily understandable to the average reader.

Each point has been dealt with separately in a four-page folder, with illustrations, showing clearly the advantages claimed for the Woods car, and in some cases contrasting the Woods method or design and construction with other cars less scientifically built.

Technicalities have been studiously avoided, even on such highly complicated subjects as the heat treatment of high-grade steels. Each point is approached from the standpoint of the reader, showing its relation to good service rather than from that of the manufacturer or engineer.

Andrew Hutchison, local distributer for the Woods electric at Indianapolis, Ind., voices the opinion that the plan of putting this material in homeopathic doses will be successful in educating the buying public on the real essential qualities of the electric car. Twelve of the folder series, entitled "The Why of a Superior Car," have already been issued. Others are being prepared and will be printed soon.

Standard Car Unique

One of the handsomest and lowest priced of many makes of electric coupes is that manufactured by the Standard Electric Car Company of Jackson, Mich., and handled in St. Paul by the Fixture Equipment Company, of which G. T. Bisbee is vice-president and general manager. One of the cars is on exhibit in the show rooms of the company at 144-148 East Sixth street.

"It is the most popular car made for the money," in the opinion of Mr. Bisbee, "and I think any one will agree after looking the car over and having a demonstration.

"Electricity is bound to be the motive power of the future for automobiles. An electric car has many advantages over a gasoline car, especially for city use. It can be run more economically, it is cleaner, it is far simpler to operate, and is more comfortable. In the colder months and in stormy weather the electric coupe has the further advantage that there is no engine to stall, no radiator to freeze, and the occupants are protected from cold or rain."

Poiret To Design Baker

Negotiations have just been completed which will mark a new era in the designing and arrangement of interior decorations of Baker electrics. M. Paul Poiret, the world-renowned French modiste and designer, has been engaged for the purpose of creating new and unusual designs in Baker upholstery.

Both here and abroad Poiret is recognized as the leading authority on style, design and color. He has just completed an extensive tour of the United States, covering cities like New York, Boston, Montreal and Chicago, where he has created design and color schemes.

With fabrics imported from Europe in color schemes especially designed for the Baker Company, he will produce effects which, it is claimed, have never been seen in a motor car before.

Baker Electric Holds Annual Convention

On November 13 the Baker Motor Vehicle Company of Cleveland called to order its second annual convention. Between the morning of that day and the evening of the 15th, was conducted one of the most successful sessions that the Baker Company has ever experienced.

Dealers from every section of the country attended. The most marked characteristic of the entire convention was the spirit of broad dealer recognition which has been developed in the Baker Company through the past year. Every session was a dealer session. Dealers were made to feel from the start that it was their convention, and as they were on the firing line it was their suggestions that were wanted. This one factor is held responsible for the unusual success of the undertaking, as the dealers contributed and took away with them more real good sales material than in any previous instance.

Among the Baker line exhibited in the assembly room were the new Baker electric coupe and the new Baker double-drive worm-gear brougham. Great interest centered around these two new models. Every dealer was given an opportunity to carefully examine the cars and question the Baker engineers on any point of construction. The result was an enthusiasm for the new cars that promises great sales activity throughout the Baker dealer organization for the coming year.

In his report to the convention, George H. Kelly, secretary of the Baker Company, stated that business for the past year had increased 25 per cent in pleasure-car sales and 130 per cent in truck sales.

Baker Motor Vehicle Convention Held at Cleveland, November 13.

PERSONAL AND BUSINESS NOTES.

The Woods Motor Vehicle Company, manufacturer of the Woods electric, announces the appointment of H. L. Goodwin as general sales director, with headquarters at the general office of the company in Chicago.

W. A. Simonson is announced as general sales manager in personal charge of the distributing agencies throughout the United States.

Joseph Stoddard, accompanied by George Weaver, who is in charge of the electric vehicle department of the Cook and Stoddard Company, attended the dealers' convention of the Baker Motor Vehicle Company at Cleveland, Ohio.

Mr. Carl Metzger, president of the Metzger-Harrington Argo Company, has just returned from an extensive trip in the east. Mr. Metzger states that the electric is becoming popular in the east, especially among the more exclusive class of people.

W. E. Cameron, previously western sales manager for the Motz Tire and Rubber Company, has recently been appointed assistant sales manager.

Mr. R. O. Brinker, previously branch manager for the Motz Tire and Rubber Company at Washington, D. C., is now manager of the commercial tire department.

William C. Little, sales manager for the Borland-Grannis Company of Chicago, has just returned from Minneapolis, where he has made negotiations to open a branch agency to handle the Borland product.

The Hudson Automobile Company, 1136 Connecticut avenue, Washington, D. C., have taken the agency for the Argo electric.

Contracts have been let for the additional story to the Anderson Electric Car Company garage at 687 Woodward avenue, Minneapolis, Minn. The front part of the additional floor will be used as a showroom for used and rebuilt cars and the stockroom and battery department will be increased in size.

D. E. Whipple, manager of the Chicago branch of the Anderson Electric Car Comapny, makers of the Detroit Electric, has just added another strong cog to his selling forces in the person of B. E. Moreland, formerly of Detroit.

The Gould Storage Battery Company has announced the location of its Detroit office, on and after December 1, as Boyer building, 88 East Congress street.

The Carl Electric Vehicle Company, of Toledo, Ohio, has been incorporated with a capital stock of $300,000 by L. M. Henders, M. G. McAleenan and B. E. Roberts.

It is stated in circles well informed and generally regarded as authentic that the Atlantic Vehicle Company, which went into receivership recently, is likely to be recovered by its old management within a short time. The company's product is so highly regarded in the trade and among its users that it is said substantial capitalists regard it as a mistake to let the business pass out of their control or be liquidated, and plans are preparing to place it again on a substantial basis.

The Buffalo Electric Vehicle Company of the Pacific Coast, of Los Angeles, Cal., has been incorporated with a capital stock of $500,000 by J. R. Avery, A. D. Avery and N. A. Boile.

Electrics in Gentral Stations

The Waverley Company of Indianapolis has supplied the Edison Electric Illuminating Company of Boston with two electric service wagons, 3,500 pounds in weight. These cars will carry a load of a thousand pounds, without counting the weight of the driver. At a maximum speed of 15 miles an hour, the car is so calculated as to run 60 miles on one battery charge.

In an underslung compartment 60 cells of type A-4 Edison storage battery supply electricity to a motor mounted on the steel frame of the car. Shaft drive is used and all driving gears enclosed. Special attention is centered in the braking equipment, which is of the dual expansion hub type, and which places both brakes on the rear hub, thereby avoiding braking through any driving mechanism. The vehicle has a wheel base of 90 inches, and a tread of 56 inches. The wheels, 34 inches in diameter, are equipped with solid cushion tires.

Chicago Company Announces Powerful Organization

What plainly marks a new epoch in electric car manufacturing and selling is emphasized by the announcement of the Chicago Electric Motor Car Company of its alliance with powerful automobile interests and the consequent asset of expansion of business facilities as well as an increase in production. Price reduction follows this economic triumph.

The Chicago company has expanded into a national institution, according to the statement of one of the men financially interested. The capitalists who formerly were financing the institution, having done a big business, planned the biggest kind of a boost for the coming season they took into their ranks such well-known men as Carl A. Neracher and A. L. Garford, long leading factors in quantity and quality production in the gas-car world.

Mr. Neracher has become president and chief engineer of the Chicago Electric Car Company, and already he has obtained a corps of men whose attainments match up with his standards of efficiency. The financial power of the company has been increased and the force and power of Mr. Garford in the industrial sphere of marketing automobiles has been enlisted to make for the bigger organizations.

A. L. Garford.

The expansion, according to the announcement, in no way affects or changes this active Chicago organization or the stockholding interests. Gail Reed has been made secretary of the expanded organization in conjunction with his duties as manager of Chicago sales and contingent territory. Penrose Reed is general sales manager. Albert F. Leopold, Albert Meyer and H. Sulzberger, all prominent Chicago financiers, remain as stockholders. It is said that Mr. Leopold will represent the Chicago stockholders on the directorate. Mr. Garford also is in the directorate.

Vehicles Form Road Show

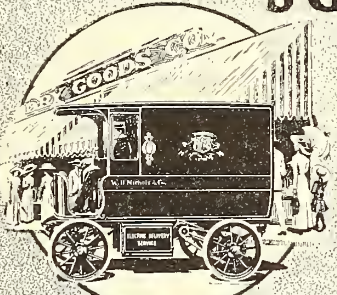
An interesting feature of the East Liberty Industrial Exposition in Pitsburgh, Pa., was an exhibit of a complete line of new Baker electric pleasure cars, which is being taken about the country by representatives from the Baker factory at Cleveland. Among the cars is a new coupe, the first car of a new model just announced, which shows the very latest production in electrics. There is also a big brougham of unusually roomy design, and a classy two-passenger roadster. The Baker road show remained at the Industrial Exposition until the first of November, when it moved on to the next stop, Cincinnati.

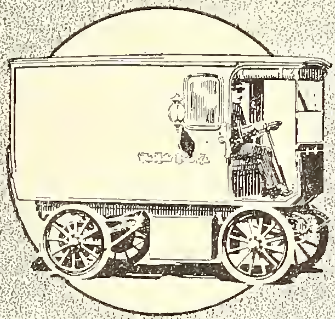
New Feature in Equipment

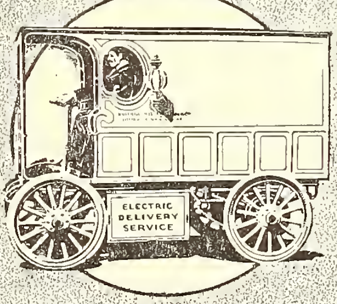
In place of the old-fashioned toilet case, Ohio electric cars are now equipped with a beautiful shopping bag, containing the finest and most useful toilet articles. It is hung upon two small hooks in the car, and can be easily removed when one desires to carry the bag.

Electric Delivery

saves time & money







EVERYWHERE—in every line of trade—Electric Delivery Wagons. For bakers, dairies, coffee and spice merchants, confectioners, florists, department stores, laundries, meat dealers, milliners, jewelers—to mention only a few.

Zampieri Brothers, French bakers, New York City, commenced the use of Electric Vehicles in 1911 with a 750 lb. Electric Wagon. As a result of the striking economy effected, this concern was made horseless in 14 months.

Mandel Brothers of Chicago, recently added ten 1000-lb. Electric Delivery Wagons to their system. The cost of operation per day, is: operating expense per vehicle, $2—including charging, washing, garaging and replacing of parts; fixed charges, $1.30—including depreciation, interest, etc; drivers' wages, $2.50 per day. The total cost of daily operation $5.80

Electric Delivery Service demands the investigation of progressive business men.

Send for this book today
"The Story of the
Electric Truck"

The facts and figures that you want to know about the Electric Truck are contained in this beautifully printed book of 36 pages—yours on request. Cost of operation, etc.—actual photographs of newest model Electric Trucks. Send for it today. Kindly address Department B.

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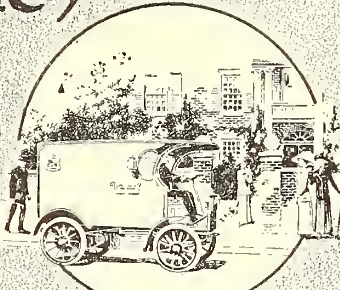

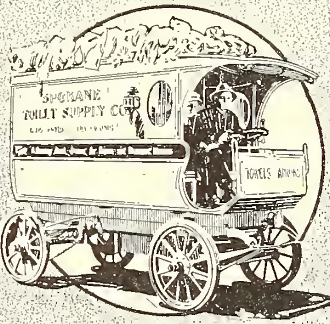

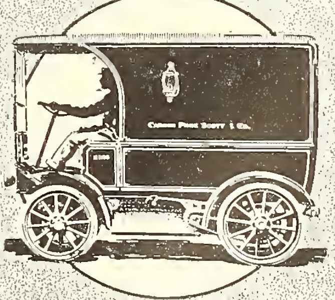

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